ASTRO

VOLUME 22 / NUMBER 8
APRIL 23, 1984
ACC. NOS. N84-17117 TO N84-18152

astronomy
TL
501
.S42
V.22
NO8

STAR

AN ABSTRACT JOURNAL

The University of Michigan Astronomy Library

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise, the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4 75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 22, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

Avail: ESDU. Pricing information on specific data items, computer programs, and details on ESDU topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page vi.

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International, Ltd.
1495 Chain Bridge Road
McLean, Virginia 22101

ESDU International, Ltd.
251-259 Regent Street
London, W1R 7AD, England

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-1)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	-- 1	-- 2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

VOLUME 22 NUMBER 8/APRIL 23, 1984

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 1095

02 AERODYNAMICS 1096

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 1100

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 1102

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 1103

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION 1104

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

07 AIRCRAFT PROPULSION AND POWER 1105

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

08 AIRCRAFT STABILITY AND CONTROL 1105

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 1106

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 1107

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

13 ASTRODYNAMICS 1108

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 1108

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air).*

15 LAUNCH VEHICLES AND SPACE VEHICLES 1109

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 1114

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING 1114

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 1114

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

19 SPACECRAFT INSTRUMENTATION N.A.

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 SPACECRAFT PROPULSION AND POWER 1121

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) N.A.
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 1122
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 1123
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 1128
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 1136
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 1139
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 1140
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 1142
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 1149
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 1154
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 1161
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 1163
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 1165
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 1167
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 1168
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 1173

43 EARTH RESOURCES 1173
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 1180
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 1182
includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 1184
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 1189
Includes weather forecasting and modification.

48 OCEANOGRAPHY 1194
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **1197**
Includes genetics.

52 AEROSPACE MEDICINE **1198**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **1202**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **1204**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **N.A.**

60 COMPUTER OPERATIONS AND HARDWARE **1207**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **1210**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **1215**
Includes computer networks.

63 CYBERNETICS **1215**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **1216**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **1222**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **1223**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **1223**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) **1226**
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS **1227**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS **1228**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **1231**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS **1231**
Includes light phenomena.

75 PLASMA PHYSICS **1232**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS **1234**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **1236**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **1237**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **1238**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **1239**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **N.A.**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **1241**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **1242**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **1242**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **1243**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **1244**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **1245**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **1246**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

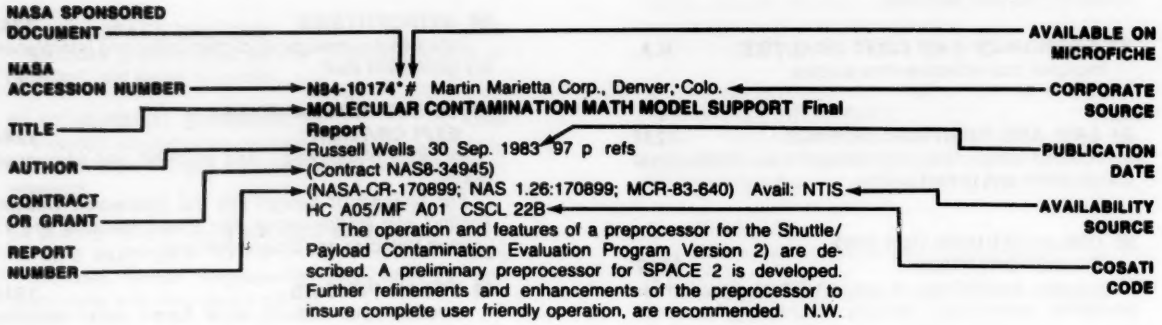
GENERAL

99 GENERAL **1247**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-57**
CORPORATE SOURCE INDEX **I-65**
CONTRACT NUMBER INDEX **I-79**
REPORT/ACCESSION NUMBER INDEX **I-83**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
NASA ACCESSION NUMBER
TITLE
AUTHOR
CONTRACT OR GRANT
REPORT NUMBER
AVAILABLE ON MICROFICHE
CORPORATE SOURCE
PUBLICATION DATE
AVAILABILITY SOURCE
COSATI CODE
N84-10174*# Martin Marietta Corp., Denver, Colo.
MOLECULAR CONTAMINATION MATH MODEL SUPPORT Final Report
Russell Wells 30 Sep. 1983 97 p refs
(Contract NAS8-34945)
(NASA-CR-170899; NAS 1.26:170899; MCR-83-640) Avail: NTIS
HC A05/MF A01 CSCL 22B
The operation and features of a preprocessor for the Shuttle/ Payload Contamination Evaluation Program Version 2) are described. A preliminary preprocessor for SPACE 2 is developed. Further refinements and enhancements of the preprocessor to insure complete user friendly operation, are recommended. N.W.

VOLUME 22 NUMBER 8/APRIL 23, 1984

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N84-17117* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING. A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 169, JANUARY 1984
Jan. 1984 115 p
(NASA-SP-7037(169); NAS 1.21:7037(169)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 409 reports, articles and other documents introduced into the NASA scientific and technical information system in December 1983. Author

N84-17118*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPECTRAL METHODS FOR THE EULER EQUATIONS: CHEBYSHEV METHODS AND SHOCK-FITTING
M. Y. Hussaini, D. A. Kopriva, M. D. Salas, and T. A. Zang Jan. 1984 35 p refs
(Contracts NAS1-17070; NAS1-17130)
(NASA-CR-172295; NAS 1.26:172295) Avail: NTIS HC A03/MF A01 CSCL 01B

The Chebyshev spectral collocation method for the Euler gas-dynamic equations is described. It is used with shock fitting to compute several two-dimensional, gas-dynamic flows. Examples include a shock-acoustic wave interaction, a shock/vortex interaction, and the classical blunt body problem. With shock fitting, the spectral method has a clear advantage over second order finite differences in that equivalent accuracy can be obtained with far fewer grid points. Author

N84-17119*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPECTRAL METHODS FOR THE EULER EQUATIONS: FOURIER METHODS AND SHOCK-CAPTURING
M. Y. Hussaini, D. A. Kopriva, M. D. Salas, and T. A. Zang Jan. 1984 34 p refs
(Contracts NAS1-17070; NAS1-17130)
(NASA-CR-172294; NAS 1.26:172294) Avail: NTIS HC A03/MF A01 CSCL 01B

Spectral methods for compressible flows are introduced in relation to finite difference and finite element techniques within the framework of the method of weighted residuals. Current spectral collocation methods are put in historical context. The basic concepts of Fourier spectral collocation methods are provided. Filtering strategies for shock-capturing approaches are also presented. Fourier shock capturing techniques are evaluated using a one dimensional, periodic astrophysical "nozzle" problem. Author

N84-17120# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
ESTIMATING THE COST OF COMPOSITE MATERIAL AIRFRAMES USING THE RAND CORPORATION DEVELOPMENT AND PROCUREMENT COSTS OF AIRCRAFT PARAMETRIC MODEL (DAPCA III) M.S. Thesis
G. D. Kage, II Sep. 1983 141 p
(AD-A134993; AFIT-LSSR-39-83) Avail: NTIS HC A07/MF A01 CSCL 05/1

The increasing use of composite material in airframes is effecting the accuracy of the current methods of estimating aircraft costs. Aluminum and composite material parts are fabricated and assembled using different processes which have different costs. Parametric models such as DAPCA III rely on a data base of all-aluminum aircraft to estimate the cost aircraft that have large amounts of composite material in them. Adjusting the estimates to reflect the composite material in the aircraft requires a detailed analysis of the composite part cost then substituting that cost for the comparable amount of aluminum. The three-step process is time consuming and inaccurate. This thesis has developed a series of indices which reflect the differences in manufacturing cost for composite parts and aluminum parts that can be applied directly to the DAPCA III output. They were developed by comparing identical parts made from aluminum and then from composites. The ICAM Manufacturing Cost/Design Guide estimated the aluminum part cost and the FACET computer program estimated the composite material part cost. Indices are provided for nonrecurring tooling manhours, recurring manufacturing manhours, and material dollar costs. Author (GRA)

N84-17121# Industrial Coll. of the Armed Forces, Washington, D.C.
IDENTIFICATION OF BOTTLENECKS AND CAPACITY CONSTRAINTS IN F-14, F-15, F-16, AND F/A-18 AIRCRAFT PRODUCTION Research Report, 1982 - 1983
J. G. Cabuk, Jr., T. J. Duncan, I. L. Hoffman, and D. V. Nowlin Apr. 1983 146 p
(AD-A134629; NDU/ICAF-83/047; RR-41) Avail: NTIS HC A07/MF A01 CSCL 15/3

This paper examines the aerospace industry capacity for surge production of tactical fighter aircraft in response to a national emergency. It provides a conceptual overview of the aerospace industry, some general industrial production factors, and a discussion of the 1966 to 67 F-4 production surge. A vertical slice study of each of the four aircraft under consideration is then provided, followed by a horizontal slice study which addresses major critical production factors and ongoing corrective actions. Author (GRA)

N84-17122# Army Inventory Research Office, Philadelphia, Pa.
SORTIE DURATION AND HELICOPTER COMPONENT FAILURES (AN EMPIRICAL STUDY)
E. Gotwals May 1983 250 p
(AD-A134745; USAIRO-TR-83/3) Avail: NTIS HC A11/MF A01 CSCL 01/3

This study investigates the effect that sorties, flying hours, and usage have on component failures for Army aircraft. The report documents the work done. It includes many graphs in the appendix depicting 20 years of 1352 flying hour data which may

be useful in other research work. It shows no relationship between failures and flying hours, sorties, or utilization. Author (GRA)

N84-17123# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Forschungsbereich Stroemungsmechanik.
THE PRANDTL HERGESELL PROJECT OF A NATIONAL RESEARCH ESTABLISHMENT FOR AERONAUTICS
Julius C. Rotta Aug. 1983 67 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-835)
(DFVLR-Mitt-83-10; ESA-TT-835) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 18,50

A historical account on the project of a national research establishment for aeronautics in Germany is presented.
Author (ESA)

N84-17124# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
FAA (FEDERAL AVIATION ADMINISTRATION) STATISTICAL HANDBOOK OF AVIATION: CALENDER YEAR 1982 Annual Report
31 Dec. 1982 202 p
(PB84-127323) Avail: NTIS HC A10/MF A01 CSCL 01B

This report presents statistical information pertaining to the Federal Aviation Administration, the National Airspace System, airports, airport activity, U.S. civil air carrier fleet, U.S. civil air carrier operating data, airmen, general aviation aircraft, aircraft accidents, aeronautical production and imports/exports, and a glossary of the terms used in this publication. GRA

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N84-17125 Brown Univ., Providence, R. I.
TWO-DIMENSIONAL SUPERSONIC EXPANSION FLOWS ON WALLS WITH NONEQUILIBRIUM CONDENSATION Ph.D. Thesis
Can Fuat Delale 1983 74 p
Avail: Univ. Microfilms Order No. DA8325969

The streamtube method for supersonic expansion flows on walls with nonequilibrium condensation is developed. It is shown that the widely used numerical method of characteristics to solve two-dimensional gas dynamic problems with nonequilibrium condensation is restricted if the radius dependence on the droplet growth rate is to be included. Some advantages of the streamtube method are explored in comparison with the numerical method of characteristics. The analysis of frozen oblique shock waves in condensing flows is carried out. A shock fitting technique is applied to determine the location of the embedded, frozen, gas dynamic, oblique shock wave due to the compressive heat addition from condensation along each streamtube. Dissert. Abstr.

N84-17126 Texas Univ., Arlington.
FINITE ELEMENT METHOD FOR INCOMPRESSIBLE LAMINAR BOUNDARY LAYER FLOWS Ph.D. Thesis
Sang-Wook Kim 1983 166 p
Avail: Univ. Microfilms Order No. DA8325713

A numerical procedure was developed for incompressible laminar boundary layer flows using the semi-discrete Galerkin finite element method. The boundary layer equations describing the continuum motion of the fluid within the boundary layer are formulated on a coordinate system fixed to the surface of the submerged body with the time-like coordinate measured in the streamwise direction of the body and the other coordinate perpendicular to the surface. Introducing a coordinate transformation which uniformly stretches the time-like coordinate inversely proportional to the characteristic length of the submerged body and uniformly expands the perpendicular coordinate proportional to the square root of the Reynolds number into the boundary layer equations yields the same form of the equations but with unit Reynolds number. Author

N84-17127*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WAVE DRAG AS THE OBJECTIVE FUNCTION IN TRANSONIC FIGHTER WING OPTIMIZATION
Pamela S. Phillips Feb. 1984 23 p refs
(NASA-TP-2265; L-15687; NAS 1.60:2265) Avail: NTIS HC A02/MF A01 CSCL 01A

The original computational method for determining wave drag in a three dimensional transonic analysis method was replaced by a wave drag formula based on the loss in momentum across an isentropic shock. This formula was used as the objective function in a numerical optimization procedure to reduce the wave drag of a fighter wing at transonic maneuver conditions. The optimization procedure minimized wave drag through modifications to the wing section contours defined by a wing profile shape function. A significant reduction in wave drag was achieved while maintaining a high lift coefficient. Comparisons of the pressure distributions for the initial and optimized wing geometries showed significant reductions in the leading-edge peaks and shock strength across the span. Author

N84-17128# Aeronautical Research Labs., Melbourne (Australia).
CALCULATION OF THE AERODYNAMIC FLOW FIELD IN THE VICINITY OF A SEA KING HELICOPTER
K. R. Reddy Jun. 1983 30 p refs
(ARL-AERO-Rept-158; AR-002-954) Avail: NTIS HC A03/MF A01

A mathematical model of the rotor wake in the vicinity of a rotorcraft fuselage is formulated taking into account the mutual interference between the rotor and fuselage. It is assumed that the vortex sheet behind each rotor blade rolls-up into a single, blade tip vortex and that the fuselage can be represented by constant source potential flow panels. The velocity field given by the combined rotor wake and fuselage model is presented for the case of a Sea King helicopter in forward flight. Author

N84-17129*# Nielsen Engineering and Research, Inc., Mountain View, Calif.
PREDICTION OF VORTEX SHEDDING FROM CIRCULAR AND NONCIRCULAR BODIES IN SUPERSONIC FLOW Final Report
M. R. Mendenhall and S. C. Perkins, Jr. Washington, D.C. NASA Jan. 1984 198 p refs
(Contract NAS1-17027)
(NASA-CR-3754; NAS 1.26:3754; NEAR-TR-307) Avail: NTIS HC A09/MF A01 CSCL 01A

An engineering prediction method and associated computer code NOZVTX to predict nose vortex shedding from circular and noncircular bodies in supersonic flow at angles of attack and roll are presented. The body is represented by either a supersonic panel method for noncircular cross sections or line sources and doublets for circular cross sections, and the lee side vortex wake is modeled by discrete vortices in crossflow planes. The three-dimensional steady flow problem is reduced to a two-dimensional, unsteady, separated flow problem for solution. Comparison of measured and predicted surface pressure distributions, flow field surveys, and aerodynamic characteristics is presented for bodies with circular and noncircular cross-sectional shapes. Author

N84-17130*# Grumman Aerospace Corp., Bethpage, N.Y.
THE COREL AND W12SC3 COMPUTER PROGRAMS FOR SUPERSONIC WING DESIGN AND ANALYSIS Final Report
William H. Mason and Bruce S. Rosen Washington, D.C. NASA Dec. 1983 188 p refs
(Contract NAS1-15351)
(NASA-CR-3676; NAS 1.26:3676) Avail: NTIS HC A09/MF A01 CSCL 01A

Two computer codes useful in the supersonic aerodynamic

design of wings, including the supersonic maneuver case are described. The nonlinear full potential equation COREL code performs an analysis of a spanwise section of the wing in the crossflow plane by assuming conical flow over the section. A subsequent approximate correction to the solution can be made in order to account for nonconical effects. In COREL, the flow-field is assumed to be irrotional (Mach numbers normal to shock waves less than about 1.3) and the full potential equation is solved to obtain detailed results for the leading edge expansion, supercritical crossflow, and any crossflow shockwaves. W12SC3 is a linear theory panel method which combines and extends elements of several of Woodward's codes, with emphasis on fighter applications. After a brief review of the aerodynamic theory used by each method, the use of the codes is illustrated with several examples, detailed input instructions and a sample case. Author

N84-17131*# Nielsen Engineering and Research, Inc., Mountain View, Calif.

A STUDY OF PREDICTION METHODS FOR THE HIGH ANGLE-OF-ATTACK AERODYNAMICS OF STRAIGHT WINGS AND FIGHTER AIRCRAFT Final Report, Jun. 1982 - Jul. 1983

O. J. McMillan, M. R. Mendenhall, and S. C. Perkins, Jr. Washington, D.C. NASA Jan. 1984 202 p refs
(Contract NAS1-17026)
(NASA-CR-3764; NAS 1.26:3764; TR-296) Avail: NTIS HC A10/MF A01 CSCL 01A

Work is described dealing with two areas which are dominated by the nonlinear effects of vortex flows. The first area concerns the stall/spin characteristics of a general aviation wing with a modified leading edge. The second area concerns the high-angle-of-attack characteristics of high performance military aircraft. For each area, the governing phenomena are described as identified with the aid of existing experimental data. Existing analytical methods are reviewed, and the most promising method for each area used to perform some preliminary calculations. Based on these results, the strengths and weaknesses of the methods are defined, and research programs recommended to improve the methods as a result of better understanding of the flow mechanisms involved. Author

N84-17132*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THEORETICAL AND EXPERIMENTAL ENGINE-INLET FLOW FIELDS FOR FIGHTER FOREBODIES

Steven F. Yaros Feb. 1984 66 p refs
(NASA-TP-2270; L-15639; NAS 1.60:2270) Avail: NTIS HC A04/MF A01 CSCL 01A

The capability of two numerical methods, one for transonic and one for supersonic flows, to predict the flow fields about representative fighter aircraft forebodies in the vicinity of the engine inlets was examined. The Mach number range covered was 0.9 to 2.5 and the angle-of-attack range was 0 deg to 25 deg. The computer progams that implement each of the numerical methods are described as to their features and usage, and results are compared with comprehensive wind tunnel data. Although both prediction methods were inviscid, results show that the aerodynamic effects of the forebody, with and without a wing, can be simulated fairly well. Futher work is needed to include the effects of viscosity, including vortex shedding. Author

N84-17133*# Wisconsin Univ., Milwaukee. Dept. of Mechanical Engineering.

NUMERICAL STUDY OF A SEPARATING AND REATTACHING FLOW BY USING REYNOLDS-STRESS TUBULENCE CLOSURE Final Report, 1 Dec. 1982 - 31 Jul. 1983

R. S. Amano and P. Goel Aug. 1983 30 p refs
(Grant NAG2-160)
(NASA-CR-166547; NAS 1.26:166547) Avail: NTIS HC A03/MF A01 CSCL 01A

The numerical study of the Reynolds-stress turbulence closure for separating, reattaching, recirculating and redeveloping flow is summarized. The calculations were made for two different closure models of pressure - strain correlation. The results were compared with the experimental data. Furthermore, these results were compared with the computations made by using the one layer and three layer treatment of k-epsilon turbulence model which were developed. Generally the computations by the Reynolds-stress model show better results than those by the k-epsilon model, in particular, some improvement was noticed in the redeveloping region of the separating and reattaching flow in a pipe with sudden expansion. S.L.

N84-17134*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AERODYNAMIC CHARACTERISTICS OF A SPARROW 3 MISSILE MODEL IN THE FLOW FIELD OF A GENERALIZED PARENT BODY AT MACH 2.86

Robert L. Stallings, Jr. Feb. 1984 29 p refs
(NASA-TM-85713; L-15705; NAS 1.15:85713) Avail: NTIS HC A03/MF A01 CSCL 01A

Longitudinal aerodynamic characteristics of a Sparrow 3 wing control missile model were measured through a range of separation distances relative to a flat plate surface that represented the parent-body configuration. Measurements were obtained with and without two dimensional circular arc protuberances attached to the flat plate surface. The tests were conducted at a Mach number of 2.86 and a Reynolds number per meter of 6.56 million. The behavior of these longitudinal characteristics with varying separation distance in the flow field created by the flat plate and protuberance was generally as would be expected on the basis of flow field boundaries determined from the second order approximation of Friedrich. In general, varying roll angle from 0 deg to 45 deg caused no significant effect on the store separation characteristics. Author

N84-17135*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LOADS AND AEROELASTICITY DIVISION RESEARCH AND TECHNOLOGY ACCOMPLISHMENTS FOR FY 1983 AND PLANS FOR FY 1984

James E. Gardner and S. C. Dixon Jan. 1984 163 p refs
(NASA-TM-85740; NAS 1.15:85740) Avail: NTIS HC A08/MF A01 CSCL 01A

Research was done in the following areas: development and validation of solution algorithms, modeling techniques, integrated finite elements for flow-thermal-structural analysis and design, optimization of aircraft and spacecraft for the best performance, reduction of loads and increase in the dynamic structural stability of flexible airframes by the use of active control, methods for predicting steady and unsteady aerodynamic loads and aeroelastic characteristics of flight vehicles with emphasis on the transonic range, and methods for predicting and reducing helicoper vibrations. B.G.

N84-17136*# Kentron International, Inc., Hampton, Va. Technical Center.

TESTS ON A CAST 7 TWO-DIMENSIONAL AIRFOIL IN A STREAMLINING TEST SECTION

M. J. Goodyear (Southampton Univ.) Jan. 1984 44 p refs
(Contract NAS1-16000)
(NASA-CR-172291; NAS 1.26:172291) Avail: NTIS HC A03/MF A01 CSCL 01A

A unique opportunity has arisen to test one and the same airfoil model of CAST-7 section in two wind tunnels having adaptive walled test sections. The tunnels are very similar in terms of size and the available range of test conditions, but differ principally in their wall setting algorithms. Detailed data from the tests of the model in the Southampton tunnel, are included with comparisons between various sources of data indicating that both adaptive walled test sections provide low interference test conditions. S.L.

N84-17137*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

BIFURCATION ANALYSIS OF AIRCRAFT PITCHING MOTIONS NEAR THE STABILITY BOUNDARY

W. H. Hui (Waterloo Univ.) and Murray Tobak Jan. 1984 33 p

refs Presented at the Conf. on Nonlinear Problems in Control and Fluid Dyn., Berkeley, Calif., 31 May - 10 Jun. 1983
(Contract NAGw-130)
(NASA-TM-85881; A-9604; NAS 1.15:85881) Avail: NTIS HC A03/MF A01 CSCL 01A

Bifuraction theory is used to analyze the nonlinear dynamic stability characteristics of an aircraft subject to single degree of freedom pitching-motion perturbations about a large mean angle of attack. The requisite aerodynamic information in the equations of motion is represented in a form equivalent to the response to finite-amplitude pitching oscillations about the mean angle of attack. This information is deduced from the case of infinitesimal-amplitude oscillations. The bifurcation theory analysis reveals that when the mean angle of attack is increased beyond a critical value at which the aerodynamic damping vanishes, new solutions representing finite-amplitude periodic motions bifurcate from the previously stable steady motion. The sign of a simple criterion, cast in terms of aerodynamic properties, determines whether the bifurcating solutions are stable (supercritical) or unstable (subcritical). For flat-plate airfoils flying at supersonic/hypersonic speed, the bifurcation is subcritical, implying either that exchanges of stability between steady and periodic motion are accompanied by hysteresis phenomena, or that potentially large aperiodic departures from steady motion may develop. Author

N84-17138*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROGRAMS FOR CALCULATING QUASI-THREE-DIMENSIONAL FLOW IN A TURBOMACHINE BLADE ROW
Theodore Katsanis 1984 22 p refs Presented at the Computational Fluid Dyn. User's Workshop, Tullahoma, Tenn. 12-16 Mar. 1984
(NASA-TM-83588; E-1983; NAS 1.15:83588) Avail: NTIS HC A02/MF A01 CSCL 01A

MERIDL is a program that calculates a meridional plane stream function solution, and TSONIC is a program that calculates a blade to blade stream function solution for turbomachine blade passages. Both programs are discussed, including input required and assumptions and limitations. Examples of use and references are included. Author

N84-17139*# Ohio State Univ., Columbus. Lab. for Aeronautical and Astronautical Research.
DOCUMENTATION OF ICE SHAPES ON THE MAIN ROTOR OF A UH-1H HELICOPTER IN HOVER Final Report
John D. Lee, Rorry Harding (Hovey and Assoc., Ltd.), and Richard L. Palko (Calspan Field Services, Inc.) Jan. 1984 30 p refs
(Grant NAG3-273)
(NASA-CR-168332; NAS 1.26:168332) Avail: NTIS HC A03/MF A01 CSCL 01C

A helicopter icing flight test program in the hover mode was conducted with a UH-1H aircraft. The ice formations were documented after landing by means of silicone rubber molds, stereo photography and outline tracings for later use in aerodynamic analyses. The documentation techniques are described and the results presented for a typical flight. S.L.

N84-17140*# Illinois Univ., Urbana. Dept. of Aeronautical and Astronautical Engineering.
TRAILING EDGE FLOW CONDITIONS AS A FACTOR IN AIRFOIL DESIGN Final Report
Allen I. Ormsbee and Mark D. Maughmer Jan. 1984 186 p refs
(Grant NAG1-76)
(NASA-CR-173294; NAS 1.26:173294; AAE-84-1;
UILU-ENG-84-0501) Avail: NTIS HC A09/MF A01 CSCL 01A

Some new developments relevant to the design of single-element airfoils using potential flow methods are presented. In particular, the role played by the non-dimensional trailing edge velocity in design is considered and the relationship between the specified value and the resulting airfoil geometry is explored. In addition, the ramifications of the unbounded trailing edge pressure gradients generally present in the potential flow solution of the flow over an airfoil are examined, and the conditions necessary to obtain a class of airfoils having finite trailing edge pressure gradients developed. The incorporation of these conditions into the inverse method of Eppler is presented and the modified scheme employed to generate a number of airfoils for consideration. The detailed viscous analysis of airfoils having finite trailing edge pressure gradients demonstrates a reduction in the strong inviscid-viscid interactions generally present near the trailing edge of an airfoil. Author

N84-17141*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MATHEMATICAL MODELING OF THE AERODYNAMIC CHARACTERISTICS IN FLIGHT DYNAMICS
Murray Tobak, Gary T. Chapman, and Lewis B. Schiff Jan. 1984 28 p refs Presented at the Berkeley-Ames Conf. on Nonlinear Probl. in Control and Fluid Dyn., Berkeley, Calif., 31 May - 10 Jun. 1983
(NASA-TM-85880; A-9603; NAS 1.15:85880) Avail: NTIS HC A03/MF A01 CSCL 01A

Basic concepts involved in the mathematical modeling of the aerodynamic response of an aircraft to arbitrary maneuvers are reviewed. The original formulation of an aerodynamic response in terms of nonlinear functionals is shown to be compatible with a derivation based on the use of nonlinear functional expansions. Extensions of the analysis through its natural connection with ideas from bifurcation theory are indicated. Author

N84-17142*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF SECONDARY FLOWS PREDICTED BY A VISCOUS CODE AND AN INVISCID CODE WITH EXPERIMENTAL DATA FOR A TURNING DUCT
John R. Schwab and Louis A. Povinelli 1984 21 p refs Presented at the Symp. on Computation of Internal Flows: Methods and Appl., New Orleans, 13-15 Feb. 1984; sponsored by ASME
(NASA-TM-83575; E-1958; NAS 1.15:83575) Avail: NTIS HC A02/MF A01 CSCL 01A

A comparison of the secondary flows computed by the viscous Kreskovsky-Briley-McDonald code and the inviscid Denton code with benchmark experimental data for turning duct is presented. The viscous code is a fully parabolized space-marching Navier-Stokes solver while the inviscid code is a time-marching Euler solver. The experimental data were collected by Taylor, Whitelaw, and Yianneskis with a laser Doppler velocimeter system in a 90 deg turning duct of square cross-section. The agreement between the viscous and inviscid computations was generally very good for the streamwise primary velocity and the radial secondary velocity, except at the walls, where slip conditions were specified for the inviscid code. The agreement between both the computations and the experimental data was not as close, especially at the 60.0 deg and 77.5 deg angular positions within the duct. This disagreement was attributed to incomplete modelling of the vortex development near the suction surface. Author

N84-17143*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INVESTIGATION OF FLOW PHENOMENA IN A TRANSONIC FAN ROTOR USING LASER ANEMOMETRY
Anthony J. Strazisar 1984 23 p refs Proposed for presentation at the 29th Ann. Intern. Gas Turbine Conf., Amsterdam, 3-7 Jun. 1984; sponsored by ASME
(NASA-TM-83555; E-1934; NAS 1.15:83555) Avail: NTIS HC A02/MF A01 CSCL 01A

Several flow phenomena including flowfield periodicity, rotor shock oscillation, and rotor shock system geometry were investigated in a transonic low aspect ratio fan rotor using laser anemometry. Flow periodicity is found to increase with increasing rotor pressure rise, and to correlate with blade geometry variations. Analysis of time-accurate laser anemometer data indicates that the rotor shock oscillates about its mean location with an amplitude of 3 to 4 percent of rotor chord. The shock surface is nearly two-dimensional or levels of rotor pressure rise at and above the peak efficiency level but becomes more complex for lower levels

of pressure rise. Spanwise shock lean generates radial flows due to streamline deflection in the hub-to-shroud streamsurface.
Author

N84-17144*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A RECONTOURED, UPPER SURFACE DESIGNED TO INCREASE THE MAXIMUM LIFT COEFFICIENT OF A MODIFIED NACA 65 (0.82) (9.9) AIRFOIL SECTION
Raymond M. Hicks Feb. 1984 40 p refs
(NASA-TM-85855; A-9514; NAS 1.15:85855) Avail: NTIS HC A03/MF A01 CSCL 01A

A recontoured upper surface was designed to increase the maximum lift coefficient of a modified NACA 65 (0.82)(9.9) airfoil section which was tested at Mach numbers of 0.3 and 0.4 and Reynolds numbers of 2.3x10(6) and 4.3x10(6). The original 6-series section was tested for comparison with the recontoured section. The recontoured profile was found to have a higher maximum lift coefficient at all test conditions than the original airfoil. The recontoured airfoil showed less drag and nearly the same pitching moment characteristics as the original 6-series airfoil at all test conditions. The improvements found for the recontoured airfoil of the present study are similar to those found during previous investigations of recontoured 6-series airfoils with less camber.
Author

N84-17145# Air Force Academy, Colo.
AIR FORCE ACADEMY AERONAUTICS DIGEST - FALL/WINTER 1982 Final Report
J. DeJongh, W. Heiser, R. Hogge, M. Arends, and A. M. Higgins Sep. 1983 153 p
(AD-A135073; USAFA-TR-83-15) Avail: NTIS HC A08/MF A01 CSCL 20/4

The Aeronautics Digest contains articles which represent recent scholarly work by students and faculty of the Dept. of Aeronautics, members of other departments of the Academy and the Frank J. Seiler Research Lab., researchers directly or indirectly involved with USAFA-sponsored projects, and authors in fields of interest to the USAFA. This issue includes reports on the following topics: Aerodynamics of square cross-section missiles; A stall-anticipating device for airfoils; Mixing of constant-area annular flows with swirl; New controls for advanced residential heating systems; Some topics on gas flow--Wave propagation (part 1); and Engineers and the art of writing.
GRA

N84-17146# Princeton Univ., N. J.
AEROELASTIC ANALYSIS USING NONLINEAR AERODYNAMIC METHODS Final Scientific Report
E. H. Dowell Aug. 1983 4 p
(Grant AF-AFOSR-0213-81; AF Proj. 2307)
(AD-A135133; AFOSR-83-0896TR) Avail: NTIS HC A02/MF A01 CSCL 20/4

During the grant year several studies have been undertaken. These are reported fully in References 1, 2, and 3. A summary of the technical highlights follows. An extended nonlinear indicial approach to modeling nonlinear aerodynamic forces for aeroelastic analyses has been developed. The basic approach is based upon describing function ideas.
Author (GRA)

N84-17147# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
THE 2-DIMENSIONAL INEXTENSIBLE LIFTING MEMBRANE AIRFOIL, THEORY AND EXPERIMENT Final Report
S. Greenhalgh 18 Feb. 1983 63 p
(AD-A135251; NADC-83096-60) Avail: NTIS HC A04/MF A01 CSCL 20/4

A theoretical solution to the aerodynamic/structural two-dimensional flexible lifting membrane has been developed. The solution predicts lift, membrane shape and excess material length as a function of the tension in the membrane and the angle of attack of the membrane. The method is simpler than existing solutions and the results are in agreement with experiment. Wind tunnel tests on two-dimensional lifting membranes have been conducted at Reynolds numbers of approximately 1.3 million. Basic aerodynamic data and membrane tension data were obtained.
Author (GRA)

N84-17148# Avco Systems Div., Wilmington, Mass.
IRAAM WIND TUNNEL TEST, TASK 3 Final Technical Report
D. Dashcund 30 Aug. 1983 63 p
(Contract DAAK10-83-D-0009)
(AD-A135256; AVSD-0343-83-RR) Avail: NTIS HC A04/MF A01 CSCL 19/1

A deceleration, orientation and stabilization system for the deployment of the anti-armor mine (IRAAM) submunition was developed and tested at the Wright-Patterson vertical wind tunnel facility. The system employs a flexible samara airfoil with a tip mass arranged to provide the proper spin rate, descent rate and coning angle. Samara wings of KEVLAR material were fabricated using a flat webbing construction and also a construction consisting of KEVLAR cords enclosed in a nylon envelope. Blades varied in both area and planform aspect ratio. Blade spans ranged from 2.5 to 10.0 inches. Blade widths varied from 2 to 4 inches. All of the IRAAM models used for testing were dimensionally full scale. One model of the nominal configuration was full weight. The other two models were half weight. The tip weight varied up to 5% of the model weight. The test program is outlined. All test procedures and equipment are described. The test results are analyzed and recommendations are made for future developmental studies.
Author (GRA)

N84-17149*# United Technologies Research Center, East Hartford, Conn.
HELICOPTER ROTOR WAKE GEOMETRY AND ITS INFLUENCE IN FORWARD FLIGHT. VOLUME 1: GENERALIZED WAKE GEOMETRY AND WAKE EFFECT ON ROTOR AIRLOADS AND PERFORMANCE
T. Alan Egolf and Anton J. Landgrebe Oct. 1983 218 p
(Contract NAS1-14568)
(NASA-CR-3726; NAS 1.26:3726; AD-A135555;
UTRC/R83-912666-58-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 20D

An analytic investigation to generalize wake geometry of a helicopter rotor in steady level forward flight and to demonstrate the influence of wake deformation in the prediction of rotor airloads and performance is described. Volume 1 presents a first level generalized wake model based on theoretically predicted tip vortex geometries for a selected representative blade design. The tip vortex distortions are generalized in equation form as displacements from the classical undistorted tip vortex geometry in terms of vortex age, blade azimuth, rotor advance ratio, thrust coefficient, and number of blades. These equations were programmed to provide distorted wake coordinates at very low cost for use in rotor airflow and airloads prediction analyses. The sensitivity of predicted rotor airloads, performance, and blade bending moments to the modeling of the tip vortex distortion are demonstrated for low to moderately high advance ratios for a representative rotor and the H-34 rotor. Comparisons with H-34 rotor test data demonstrate the effects of the classical, predicted distorted, and the newly developed generalized wake models on airloads and blade bending moments. Use of distorted wake models results in the occurrence of numerous blade-vortex interactions on the forward and lateral sides of the rotor disk. The significance of these interactions is related to the number and degree of proximity to the blades of the tip vortices. The correlation obtained with the distorted wake models (generalized and predicted) is encouraging.
GRA

N84-17150# Thermal Sciences, Inc., Sunnyvale, Calif.
ASSESSMENT OF REAL GAS EFFECTS ON THE PREDICTION OF THE AERODYNAMICS OF HIGH VELOCITY ARMY SHELLS Final Report
W. E. Nicolet and G. R. Srinivasan Sep. 1983 45 p
(Contract DAAG29-81-D-0100; DA Proj. 1L1-62618-AH-80)
(AD-A134739; AD-F300341; ARBRL-CR-00517) Avail: NTIS HC A03/MF A01 CSCL 20/4

The present study assesses real gas effects in the prediction of flow fields over Army projectiles. Solutions are obtained for a spherically tipped cone-cylinder model flying at three different flight conditions. Real gas effects may be important for the pressure and heat transfer on the spherical tip. Real gas effects are not important for the prediction of pressure and heat transfer on the region of the model aft of the spherical tip. GRA

N84-17151# Sandia Labs., Albuquerque, N. Mex. Parachute Systems Div.
DEVELOPMENT OF THE PARACHUTE RECOVERY SYSTEM FOR THE LBRV-2 REENTRY VEHICLE
William B. Pepper Nov. 1983 17 p refs
(Contract DE-AC04-76DP-00789)
(DE84-003340; SAND-83-0432) Avail: NTIS HC A02/MF A01

A single-stage 6.44-ft-dia ribbon parachute was developed for deceleration and recovery of a 130-lb nose cone. Recovery procedures begin with jettisoning a part of the initial reentry mass before the parachute is deployed. An operational reentry vehicle flight resulted in recovery of the payload (in two pieces) and the undamaged parachute. DOE

N84-18089*# Massachusetts Inst. of Tech., Cambridge.
ADAPTATION OF TWO-DIMENSIONAL TRANSONIC ANALYSIS CODE, TSFOIL, FOR USE IN MODELING ADAPTIVE WALL TEST SECTIONS Final Report
Jonathan Webb *In its* A Coop. Program to Stimulate Student Involvement through the MIT Undergraduate Research Opportunity Program Jan. 1984 19 p refs (For primary document see N84-18086 08-80)
Avail: NTIS HC A05/MF A01 CSCL 01A

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N84-17152# Committee on Science and Technology (U. S. House).
AIRPORT AND AIRCRAFT SAFETY RESEARCH AND TECHNOLOGY
Washington, D.C. GPO 1983 58 p Presented by the Subcomm. on Transportation, Aviation and Mater. to the Comm. on Sci. and Technol., 98th Congr., 1st Sess., Oct. 1983
(GPO-26-497) Avail: Subcommittee on Transportation, Aviation and Materials

Various topics relating to airport and aircraft safety research and technology are discussed. Aircraft cabin fire safety research centering on the development of less flammable cabin wall, ceiling, and floor materials is discussed. Anti-misting fuels are discussed. The role of aircraft maintenance is discussed. Airport certification requirements are discussed. R.J.F.

N84-17153# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
DATA ACQUISITION FOR EVALUATION OF AN AIRBORNE LIGHTNING DETECTION SYSTEM Final Report, Jun. - Aug. 1981
L. C. Walko and M. J. Reazer Sep. 1983 62 p
(DA Proj. 240-2)
(AD-A135318; AFWAL-TR-83-3083) Avail: NTIS HC A04/MF A01 CSCL 04/2

A data acquisition system was flown on a WC-130 aircraft to acquire data for evaluation of the Ryan Stormscope for potential use of such a system on USAF aircraft. The data acquisition system consisted of an instrument panel containing the Stormscope display, an aircraft weather radar display, an IRIG-B time display, and video recording system. Data were acquired during the summer of 1981 in the Florida area during a program conducted jointly by the Air Force Wright Aeronautical Laboratories and the National Oceanographic and Atmospheric Administration for the airborne characterization of lightning. The IRIG-B time reference permitted correlating of the Stormscope data, airborne and ground weather radar data, and electromagnetic measurement data from the lightning characterization program. Typical data acquired are presented along with corresponding data from electromagnetic sensors. A comparative discussion of the data from the various systems is presented. The data will undergo further analysis sponsored by the Warner Robins Air Logistics Center.
Author (GRA)

N84-17154# Naval Weapons Engineering Support Activity, Washington, D. C.
AIRCREW AUTOMATED ESCAPE SYSTEMS (AAES) IN-SERVICE USAGE DATA ANALYSES, VOLUME 1 Annual Report, 1 Jan. - 31 Dec. 1979
C. W. Stokes, III , G. R. Herd, F. G. Guill, and J. F. Palmer 5 Nov. 1983 625 p Presented at 21st Ann. SAFE Symp., San Antonio, 5-8 Nov. 1983
(AD-A134833; NAVWESA-1-83-Vol-1) Avail: NTIS HC A99/MF A01 CSCL 01/3

Compilation of papers concerning ejection seat type aircrew automated escape systems (AAES) inservice usage and experience. Subjects include: Problems in using success rates to quantify escape system reliability; The effects of family ties among ejection seats; A critique of U.S. Navy ejection seat design; Test and R&M specifications; Discussions of plans for continuing to analyze escape system usage data; In-service safety aspects of ejection seat type escape systems; Quality assurance planning of escape systems testing and test data acquisition; Analysis of windblast, flail and tumble; Factors influencing frequency and severity of neck injuries sustained by ejectees; Mishap aircrew anthropometry analysis and screening techniques; Discussion of maintenance induced fatalities and injuries; Experience with side-by-side unsequenced ejection seats; Pilot study to ascertain means for enhancing knowledge concerning usage of life support systems during ejections; Injury and equipment damage patterns; The flight surgeon's report (FSR) usefulness; and Proposed field investigator's guides for investigating the emergency use of escape and life support systems. Author (GRA)

N84-17155# Naval Weapons Engineering Support Activity, Washington, D. C.
AIRCREW AUTOMATED ESCAPE SYSTEMS (AAES) IN-SERVICE USAGE DATA ANALYSES, VOLUME 2 Annual Report, 1 Jan. - 31 Dec. 1979
C. W. Stokes, III , G. R. Herd, F. G. Guill, and J. F. Palmer 5 Nov. 1983 472 p Presented at 21st Ann. SAFE Symp., San Antonio, 5-8 Nov. 1983
(AD-A134834; NAVWESA-1-83-Vol-2) Avail: NTIS HC A20/MF A01 CSCL 01/3

Ejection seat type aircrew automated escape systems are discussed. Also discussed are the following topics: The Flight Surgeon's Report from a data user's viewpoint (reprint), Aircrew Life Support Systems (ALSS), Post Emergency Usage Investigation Guides--Aircrew protection helmets, Oxygen equipment; man-mounted; Aircrew personnel flotation equipment (Life preservers), Survival vests, and Integrated torso harness, and Aircrew Life Support Equipment Post-Usage Investigation/Reportage generic decision tree; Associated Data Appendices--Neck injury cases data, Maintenance error major malfunction cases data, and Fault tree Bad Item Out the Gate, drawings. GRA

N84-17156# Federal Aviation Administration, Washington, D.C. Office of Civil Aviation Security.
SEMIANNUAL REPORT TO CONGRESS ON THE EFFECTIVENESS OF THE CIVIL AVIATION SECURITY PROGRAM Report, 1 Jan. - 30 Jun. 1983
21 Oct. 1983 20 p
(AD-A134860; DOT/FAA-ACS-83-1(18)) Avail: NTIS HC A02/MF A01 CSCL 01/2

This report provides details on the effectiveness of security screening of passengers and all property intended to be carried in the aircraft cabin in air transportation or intrastate air transporta-

tion. It also provides a statistical summary of aircraft hijackings and alleged violations of Federal Aviation regulations pertaining to security screening. Author (GRA)

N84-17157# Boeing Military Airplane Development, Seattle, Wash.
INTEGRATED AIRCRAFT FUEL TANK INERTING AND COMPARTMENT FIRE SUPPRESSION SYSTEM. VOLUME 2: EVALUATION OF NITROGEN-ENRICHED AIR AS A FIRE SUPPRESSANT Final Report, 15 Aug. 1979 - 29 Oct. 1982
L. A. Desmarais and F. F. Tolle Wright-Patterson AFB, Ohio AFWAL Apr. 1983 242 p
(Contract F33615-79-C-2027; AF Proj. 3048)
(AD-A134883; D180-27265-2; AFWAL-TR-83-2021-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 01/3

Aircraft onboard generation of nitrogen-enriched air (NEA) for fuel tank inerting offers significant advantages over the stored nitrogen concept currently in use. Additionally, the excess NEA generated in flight offers a potential fire extinguishing agent. To evaluate this potential, a small scale test apparatus was designed based on a survey of actual aircraft fires. Two configurations were used to simulate fires dominated by either forced convection or free convection. The fire types investigated were pool, spray, hot surface and combat damage. Test variables included air temperature, fuel type, fuel flow rate and surface temperature. Prior to developing conclusions on the effectiveness of NEA, verification tests were run using other common extinguishing agents (CO2, LN2, and Halon 1301). The quantity of agents required corresponded well with accepted levels based on previous tests. Several important findings were made. The data, presented in terms of volume percentage (air + extinguishant flow) of extinguishing agent required for fire knock-down, indicates the hot surface fire type to be the most severe. A volume concentration of 72% NEA9 (9% oxygen by volume) was found to be effective in knocking down the hot surface fire. While this concentration is high, when compared on weight basis, NEA compares favorably with other agents. GRA

N84-17158# Civil Aeromedical Inst., Oklahoma City, Okla. Civil Aeromedical Inst.
THE 1980 AND 1981 ACCIDENT EXPERIENCE OF CIVIL AIRMEN WITH SELECTED VISUAL PATHOLOGY
J. R. Dille and C. F. Booze, Jr. Jul. 1983 11 p
(AD-A134898; FAA-AM-83-18) Avail: NTIS HC A02/MF A01 CSCL 01/2

In studies of the 1974-76 accident experience of U.S. general aviation pilots with static physical defects, all the significantly increased rates and ratios were for visual defect categories--blindness, or absence of either eye, deficient distant vision, deficient color vision with no operational limitations, and contact lenses. A 1979 study was limited to accident airmen with 19 visual deficiencies. The 1,140 pilots with aphakia and 173 with artificial lens implants had significantly higher rates, but the monocular pilots and contact lens users did not. The present study examined the 1980-81 accident experience of 4,169 monocular pilots, 1,299 with amblyopia, 969 with aphakia, 285 with lens implants, 118 with a history of diplopia, 1,269 with a tropia, 2,601 with hyperphoria >1 diopter, and 2,711 with esophoria or exophoria >6 diopters by class of medical certificate held. Numbers were too small for statistical treatment, but first and second class medical certificate holders, who often have more accidents per 1,000 airmen, consistently had progressively lower accident rates per 100,000 hours. They fly more. Monocular, aphakic, lens implant, and amblyopic accident airmen had higher accident rates than did the total airman population. Bases were found to question the value and adequacy of phoria and field of vision testing. GRA

N84-17159# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
EXPLOSION AND FIRE HAZARDS IN AN OIL-OXYGEN SYSTEM
Annika Forsbeck Sep. 1983 23 p refs In SWEDISH; ENGLISH summary
(FOA-C-20507-D1; ISSN-0347-3694) Avail: NTIS HC A02/MF A01

Oil was found in the oxygen refilling-system of the 37 Viggen aircraft. Explosion and fire hazards were investigated. The oil was found in the compressed oxygen cylinders and in the cylinders used for transportation on the ground. The oil probably leaked through filters in a compressor used in cleaning the cylinders. The possible energy release, due to an oil/oxygen reaction, and the quantity of piping material that could be heated to the oil/oxygen mixture combustion temperature were calculated. The released energy (100's of mj) could heat 1 mg metal to an assumed ignition temperature of 500 C. Even if the oil-oxygen mixture is supposed to self-ignite, explosion or fire is unlikely. Author (ESA)

N84-17160# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Hauptabteilung Verkehrforschung.
EFFECTS ON RAIL TRANSPORT CAUSED BY AIR TRANSPORT SUPPLY ALTERNATIVES WITHIN THE FEDERAL REPUBLIC OF GERMANY FOR THE YEAR 2000
Rolf Juergen Haupt Jul. 1983 35 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-83-14) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 14

Substitution potential from air to rail services in West Germany is evaluated. Travel time, travel destination and travel purpose were analyzed. It is concluded that an average rail speed of 160 km/h will affect the domestic air traffic by 8% to 10%, and that for an average rail speed of 280 Km/hr (e.g., magnetic rail transportation) a substitution ratio of about 50% is expected. Author (ESA)

N84-17161# British Aerospace Public Ltd. Co., Bristol (England).
DEVELOPMENTS IN CABIN SAFETY AND CRASHWORTHINESS
Alan P. Simmons 1983 19 p refs
Avail: NTIS HC A02/MF A01

Developments in the basic philosophies and detail design parameters concerning cabin safety which may be available and acceptable from a cost and weight penalty standpoint during the next decade are discussed. The cabin furnishings and equipment fit of a hypothetical Advanced Transport, entering service in 10 years, is considered. Project planning, design and manufacturing lead times dictate that such an aircraft will employ techniques at or just beyond today's state-of-the-art. Author (ESA)

N84-17162# Harvard Univ., Cambridge, Mass. Div. of Applied Sciences.
COMPUTER MODELING OF AIRCRAFT CABIN FIRES Final Report, Jun. 1981 - Dec. 1982
Howard W. Emmons and Henri E. Mitler Jun. 1983 95 p refs Sponsored in part by FAA
(Contract NB81-NADA-2026)
(PB84-101153; HOME-FIRE-PROJECT-TR-57; NBS-GCR-83-431) Avail: NTIS HC A05/MF A01 CSCL 01C

Two aspects of the fire that can occur after an aircraft crash landing were considered. Often a crash opens a hole in the cabin. Frequently, the wing damage opens a fuel tank and fuel spread on the ground catches fire. If the fire occurs below the hole in the cabin, fire gases and flames may enter the cabin and set it afire. Furthermore, after the gases enter the cabin, those gases and any generated by fire in the cabin itself flow as a nonsteady ceiling jet down the length of the cabin. Finally, the nature of the fire gas flow into the cabin is influenced by whether or not and where the occupants open a door to escape. Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N84-17163 Elliott-Automation Space and Advanced Military Systems Ltd., Frimley (England).
REDUCING RISK IN SEAWAYS
A. D. Fletcher Jun. 1983 27 p Presented at GEC Corporate Exhibition and Symp., Frimley, Engl.
Copyright. Avail: Issuing Activity

In order to establish relative risks to dangerous cargo carriers, a methodology was developed by which risk increasing and risk reducing factors are established for different geographical areas and applied to values of traffic density. These factors are related to the nature of the incident (e.g., collision, grounding) its cause (e.g., navigational and human error, heavy weather) and the services which might reduce risk (e.g., navigation aids, traffic separation). Means of qualifying the costs and effectiveness of navigation aids for coastal navigation, pilotage, and their hazard warning roles are discussed. Author (ESA)

N84-17164# Committee on Science and Technology (U. S. House).
SATELLITE-DIRECTED NAVIGATIONAL GUIDANCE FOR AIRCRAFT
Washington GPO 1983 6 p Rept. to accompany H. Con. Res. 190 presented by the Comm. on Sci. and Technol., 98th Congr., 1st Sess., 8 Nov. 1983
(H-Rept-98-510; GPO-26-860) Avail: US Capitol, House Document Room

Research and development program planning documentation leading to expedited use by the civilian sector of certain satellite-directed navigation aids is presented. A satellite directed navigation system, the NAVSTAR Global Positioning System is capable of providing three dimensional positioning and guidance in the air and two dimensional positioning and guidance on the ground to an accuracy of 15 meters. These capabilities offer many advantages to civil aviation, particularly for more accurate oceanic navigation and more efficient use of airspace. S.L.

N84-17165*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A COMPARISON OF TWO POSITION ESTIMATE ALGORITHMS THAT USE ILS LOCALIZER AND DME INFORMATION. SIMULATION AND FLIGHT TEST RESULTS
Charles E. Knox, Dan D. Vicroy, and Charles Scanlon (Arkansas State Univ.) Feb. 1984 39 p refs
(NASA-TP-2281; L-15711; NAS 1.60:2281) Avail: NTIS HC A03/MF A01 CSCL 17G

Simulation and flight tests were conducted to compare the accuracy of two algorithms designed to compute a position estimate with an airborne navigation computer. Both algorithms used ILS localizer and DME radio signals to compute a position difference vector to be used as an input to the navigation computer position estimate filter. The results of these tests show that the position estimate accuracy and response to artificially induced errors are improved when the position estimate is computed by an algorithm that geometrically combines DME and ILS localizer information to form a single component of error rather than by an algorithm that produces two independent components of error, one from a DMD input and the other from the ILS localizer input. Author

N84-17166*# Ball Bros. Research Corp., Boulder, Colo. Div. of Electro-Optical Products.
BREADBOARD STELLAR TRACKER SYSTEM TEST REPORT Final Report, Oct. 1982 - Jan. 1984
J. C. Kollodge and K. A. Parrish Jan. 1984 58 p
(Contract NAS8-34263)
(NASA-CR-170973; NAS 1.26:170973; TR83-25) Avail: NTIS HC A04/MF A01 CSCL 17G

BASD has, in the past, developed several unique position tracking algorithms for charge transfer device (CTD) sensors. These algorithms provide an interpixel transfer function with the following characteristics: (1) high linearity; (2) simplified track logic; (3) high gain; and (4) high noise rejection. A previous test program using the GE charge injection device (CID) showed that accuracy for BASD's breadboard was limited to approximately 2% of a pixel (1 sigma) whereas analysis and simulation indicated the limit should be less than 0.5% of a pixel, assuming the limit to be detector response and dark current noise. The test program was conducted under NASA contract No. NAS8-34263. The test approach for that program did not provide sufficient data to identify the sources of error and left open the amount of contribution from parameters such as image distribution, geometric distortion and system alignment errors. B.W.

N84-17167*# Intermetrics, Inc., Huntsville, Ala.
IMCS REFLIGHT CERTIFICATION REQUIREMENTS AND DESIGN SPECIFICATIONS
10 Jan. 1984 69 p
(Contract NAS8-33825)
(NASA-CR-170968; NAS 1.26:170968; IR-AL-016) Avail: NTIS HC A04/MF A01 CSCL 17G

The requirements for reflight certification are established. Software requirements encompass the software programs that are resident in the PCC, DEP, PDSS, EC, or any related GSE. A design approach for the reflight software packages is recommended. These designs will be of sufficient detail to permit the implementation of reflight software. The PDSS/IMC Reflight Certification system provides the tools and mechanisms for the user to perform the reflight certification test procedures, test data capture, test data display, and test data analysis. The system as defined will be structured to permit maximum automation of reflight certification procedures and test data analysis. B.G.

N84-17168*# Ohio Univ., Athens. Dept. of Electrical and Computer Engineering.
PATH DISCREPANCIES BETWEEN GREAT CIRCLE AND RHUMB LINE
Rajan Kaul Dec. 1983 18 p refs
(Contract NGR-36-009-017)
(NASA-TM-85522; NAS 1.15:85522; TM-89) Avail: NTIS HC A02/MF A01 CSCL 17G

A mathematical model for a comparative analysis of great circle vs. rhumb line navigation in the continental United States has been developed at the Avionics Engineering Center, Ohio University. A FORTRAN simulation of the model has been implemented on the IBM 370 computer. The simulation predicts pertinent navigation information for the two flight paths. The basis for the project, which is a part of an M.S. thesis, is to provide a data base for computing discrepancies between the two flight paths. This document briefly describes the model and discusses the implications of the results obtained. Author

N84-17169# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Lasertechnik.
RESULTS OF A SLANT RANGE VISIBILITY FIELD TEST IN MUNICH-REIM
Christian Werner, Hartmut Herrmann, and Felix Bachstein (FB Elektronik) Apr. 1983 46 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-83-09) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 15,80

An eye-safe slant visual range measuring device is presented. It comprises an eye-safe cloud ceilograph connected to a lidar receiver. The system was installed at Munich-Riem airport. Measured values of standard slant visibility in the final approach region were transferred to a computer system. The slant visibility range (SVR) was calculated by using additional information on

sky brightness and lamp intensity. The computed values of SVR, and runway visual range were transmitted by air traffic control to approaching aircraft. No improvement of visibility is ascertained, but this may be due to the short duration of the field test.
Author (ESA)

N84-17170# Transportation Systems Center, Cambridge, Mass.
SYNOPSIS AND RECOMMENDATIONS OF THE TSC WORKSHOP ON DIFFERENTIAL OPERATION OF NAVSTAR GPS, JUNE 1983
Rudolph M. Kalafus Oct. 1983 39 p Sponsored in part by the Coast Guard
(PB84-121599; DOT-TSC-RSPA-83-10) Avail: NTIS HC A03/MF A01 CSCL 17G

The primary purpose of the workshop was to initiate the development of a standard for the broadcast of differential corrections from a reference station for reception and use by a population of nearby users. The result of the workshop was a strawman signal format that, if adopted as a standard, would enable receiver manufacturers to provide differential capability by the time the NAVSTAR GPS becomes fully operational. The proposed format, patterned after the NAVSTAR GPS satellite data format, is flexible enough to accommodate several communications techniques, and to provide high-accuracy service to a variety of air, marine and land users. It also allows room for future growth and for applications to specialized user groups. Author

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N84-17171*# Washington Univ., St. Louis, Mo. Dept. of Mechanical Engineering.
DESIGN OF HELICOPTER ROTOR BLADES FOR OPTIMUM DYNAMIC CHARACTERISTICS Semiannual Status Report, 16 Jul. 1983 - 17 Jan. 1984
David A. Peters, Timothy Ko, Alfred Korn (Southern Illinois Univ., Edwardsville), and Mark P. Rossow (Southern Illinois Univ., Edwardsville) 17 Jan. 1984 29 p refs
(Grant NAG1-250)
(NASA-CR-175380; NAS 1.26:175380; SASR-4) Avail: NTIS HC A03/MF A01 CSCL 01C

The optimal design of helicopter rotor blades is addressed. The forced response of an initial (i.e., non-optimized) blade to those of a final (optimized) blade are compared. Response of starting design and optimal designs for varying forcing frequencies, blade response to harmonics of rotor speed, and derivation of mass and stiffness matrices or functions of natural frequencies are discussed. Author

N84-17172*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
DYNAMICS AND CONTROL OF FORWARD SWEPT WING AIRCRAFT Final Report, 1 Nov. 1982 - 31 Dec. 1983
David K. Schmidt and Terence A. Weisshaar 10 Feb. 1983 43 p refs
(Grant NAG1-305)
(NASA-CR-175369; NAS 1.26:175369) Avail: NTIS HC A03/MF A01 CSCL 01C

Aspects of non-zero differential game theory with application to multivariable control synthesis and optimal linear control law design using optimum parameter sensitivity analysis are discussed. Author

N84-17173*# Rockwell International Corp., Los Angeles, Calif.
AIRLOADS RESEARCH STUDY. VOLUME 1: FLIGHT TEST LOADS ACQUISITION Final Report
M. D. Bartlett, T. F. Feltz, A. D. Olsen, Jr., D. B. Smith, and P. F. Wildermuth Jan. 1984 125 p 2 Vol.
(Contract NAS4-2769)
(NASA-CR-170409; NAS 1.26:170409; NA-76-562) Avail: NTIS HC A06/MF A01 CSCL 01C

The acquisition of B-1 aircraft flight loads data for use in subsequent tasks of the Airloads Research Study is described. The basic intent is to utilize data acquired during B-1 aircraft tests, analyze these data beyond the scope of Air Force requirements, and prepare research reports that will add to the technology base for future large flexible aircraft. Flight test data obtained during the airloads survey program included condition-describing parameters, surface pressures, strain gage outputs, and loads derived from pressure and strain gauges. Descriptions of the instrumentation, data processing, and flight load survey program are included. Data from windup-turn and steady yaw maneuvers cover a Mach number range from 0.7 to 2.0 for a wing sweep position of 67.5 deg. Author

N84-17174*# Rockwell International Corp., Los Angeles, Calif.
AIRLOADS RESEARCH STUDY. VOLUME 2: AIRLOAD COEFFICIENTS DERIVED FROM WIND TUNNEL DATA Final Report
M. D. Bartlett, T. F. Feltz, A. D. Olsen, Jr., D. B. Smith, and P. F. Wildermuth Jan. 1984 116 p refs 2 Vol.
(Contract NAS4-2769)
(NASA-CR-10410; NAS 1.26:170410; NA-76-563) Avail: NTIS HC A06/MF A01 CSCL 01C

The development of B-1 aircraft rigid wind tunnel data for use in subsequent tasks of the Airloads Research Study is described. Data from the Rockwell International external structural loads data bank were used to generate coefficients of rigid airload shear, bending moment, and torsion at specific component reference stations or both symmetric and asymmetric loadings. Component stations include the movable wing, horizontal and vertical stabilizers, and forward and aft fuselages. The coefficient data cover a Mach number range from 0.7 to 2.2 for a wing sweep position of 67.5 degree. Author

N84-17175*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FRICTION AND WEAR BEHAVIOR OF ALUMINUM AND COMPOSITE AIRPLANE SKINS
Karen E. Jackson Feb. 1984 28 p refs Prepared in cooperation with Army Research and Technology Labs., Fort Eustis, Va.
(DA Proj. 1L1-61102-AH-45)
(NASA-TP-2262; NAS 1.60:2262; AVSCOM-TR-83-B-7; L-15697) Avail: NTIS HC A03/MF A01 CSCL 01C

Friction and wear behavior was determined for small skin specimens under abrasive loading conditions typical of those occurring on the underside of a transport airplane during emergency belly landing. A test apparatus consisting of a standard belt sander provided the sliding surface. Small test specimens constructed of aluminum, standard graphite-epoxy composite, aramid-epoxy composite, and toughened-resin composites were tested under a range of pressures, belt velocities, and belt-surface textures. The effects of these test variables on the wear rate and the coefficient of friction are discussed and comparisons are made between the composite materials and aluminum. The effect of fiber orientation in the composite materials on wear rate was also investigated. In addition, tests were performed in which thermocouples were imbedded into the various test specimens to obtain temperature-time histories during abrasion. Author

N84-17176# Simula, Inc., Tempe, Ariz.
CRASHWORTHY CYCLIC CONTROL STICK Final Report, Oct. 1982 - Jun. 1983
D. K. Eisentraut and R. E. Zimmerman Nov. 1983 78 p
(Contract DAAK51-82-C-0039; DA Proj. 1L1-62209-AH-76)
(AD-A135150; TR-83412; USAAVRADCOM-TR-83-D-23) Avail: NTIS HC A05/MF A01 CSCL 01/4

In helicopter crashes, a potential source of injury is crewmember impact with the cyclic control stick. This program sought to alleviate that hazard through the development of a crashworthy cyclic control stick retrofittable to the UH-60A Black

Hawk and AH-1S Cobra helicopters. Concepts examined for this application included those employing frangible, deformable, telescoping, collapsing, and separating sticks, as well as the cutters. The selected design was a slip joint separating stick, with an energy absorber, activated by crewmember impact. Four prototypes were fabricated and tested, both statically and dynamically. The newly designed sticks were shown to withstand specified emergency loads, while separating at crash impact loads of 1/2 to 1/3 that of conventional sticks. Further, the energy-absorbing capacity of the stick prevents completion of stick delethalization motion for loads of very short duration and thus minimizes the risk of inadvertant separation. Author (GRA)

N84-17177# Information Spectrum, Inc., Arlington, Va.
LESSONS LEARNED--ADVANCED ATTACK HELICOPTER
Garcia E. Morrow, Charles Lowe, and Elmer H. Birdseye 15 Jul. 1983 117 p
(Grant MDA903-82-G-0055)
(AD-A135521; ISI-V-3835-04) Avail: NTIS HC A06/MF A01 CSCL 05/1

This study focuses on the success of the AAH Program Office in coping with problems and issues in such areas as technology, technical risks, business management, and transitioning to production. It identified the following basic factors which contributed to the success of the AAH program: continuity of key personnel within the program management office; innovative planning and effective management of the competition; continuing Army support of the AAH program as an integral part of force modernization; and intensive management when required. Lessons learned include: Recognition that a design-to-cost program may not serve to discipline cost growth; Fabrication of prototypes during engineering or advanced development is necessary; Subsystem integration on a complex weapon system is facilitated by establishment of an interface control working group; Program office personnel at the test site can improve test continuity and provide managers with timely status reports; The magnitude of the logistics support analysis effort must be clearly stated by the Government and well understood by all contractors and subcontractors; Current spare requirements should be based on the current expected failure rates not on the maturity rate which may not be reached for several years; The success of a weapon system acquisition program is as dependent upon overcoming the chaos of the Federal budgetary process, the degree of agreement obtained among executive departments, and the leadership of the program manager as it is upon hardware development. GRA

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N84-17178*# Research Triangle Inst., Research Triangle Park, N.C.
CDTI TARGET SELECTION CRITERIA Final Report
C. L. Britt, C. M. Davis, C. B. Jackson, and V. A. McClellan Washington, D.C. NASA Feb. 1984 133 p refs
(Contract NAS1-16304)
(NASA-CR-3776; NAS 1.26:3776; RTI/2095/00-01-F) Avail: NTIS HC A07/MF A01 CSCL 01D

A Cockpit Display of Traffic Information (CDTI) is a cockpit instrument which provides information to the aircrew on the relative location of aircraft traffic in the vicinity of their aircraft (township). In addition, the CDTI may provide information to assist in navigation and in aircraft control. It is usually anticipated that the CDTI will be integrated with a horizontal situation indicator used for navigational purposes and/or with a weather radar display. In this study, several sets of aircraft traffic data are analyzed to determine statistics on the number of targets that will be displayed on a CDTI using various target selection criteria. Traffic data were obtained from an Atlanta Terminal Area Simulation and from radar tapes recorded at the Atlanta and Miami terminal areas. Results are given in the form of plots showing the average percentage of time (or probability) that an aircraft equipped with a CDTI would observe from 0 to 10 other aircraft on the display for range settings on the CDTI up to 30 n. mi. and using various target discrimination techniques. Author

N84-17179# Illinois Univ., Urbana. Decision and Control Lab.
CONTROL STRATEGIES FOR COMPLEX SYSTEMS FOR USE IN AEROSPACE AVIONICS Final Scientific Report, 1 Jul. 1978 - 30 Jun. 1983
J. B. Cruz, Jr., P. V. Kokotovic, and W. R. Perkins Aug. 1983 29 p
(Grant AF-AFOSR-3633-78; AF Proj. 2304)
(AD-A135072; DC-63; T-129; AFOSR-83-0981TR) Avail: NTIS HC A03/MF A01 CSCL 09/3

The research program was focused on investigating new methods of analysis, synthesis, and optimization of control systems, particularly those which contain disturbance inputs, uncertain parameters, and other modeling uncertainties. The general objective was to develop new methods to improve the performance of control systems by counteracting the effects of these modeling uncertainties and disturbance inputs. The new methods can be classified into several general categories; multivariate feedback design in the frequency domain based on the comparison sensitivity matrix and robustness concepts, adaptive observers and adaptive control, multiple time-scale and singular perturbations, chained aggregation methods, and incentive controllers for hierarchical systems. Author (GRA)

N84-17180# Hughes Aircraft Co., El Segundo, Calif. Display Systems Lab.
HEAD-UP DISPLAY (HUD) TECHNOLOGY DEMONSTRATION Final Report, 15 Apr. 1980 - 30 Mar. 1983
J. E. Gunther, R. G. Hegg, and S. E. Shields Wright-Patterson AFB, Ohio AFWAL Jul. 1983 107 p
(Contract F33615-79-C-1887; AF Proj. 2003)
(AD-A134695; HAC-E6093; AFWAL-TR-83-1106) Avail: NTIS HC A06/MF A01 CSCL 09/1

The objectives of the Head-Up Display Technology Demonstration program were to demonstrate the feasibility of constructing liquid crystal matrix display modules with high optical performance and few defective elements, and of using optical projection techniques to combine the images from multiple, physically separate, display modules into a continuous high resolution display surface. Most of the original objectives of Head-Up Display Technology Demonstration program have been achieved or exceeded. Major improvements in display brightness and contrast have resulted from the development of improved matrix smoothing techniques and specular projection systems, and from the incorporation of low reflectivity transparent electrodes. The 60% reflectivity and greater than 30:1 contrast of the liquid crystal modules produced on this program are adequate to meet all known projection display requirements. GRA

N84-17181# Army Aviation Research and Development Command, St. Louis, Mo.
AN AIRBORNE PROGRAMMABLE DIGITAL TO VIDEO CONVERTER
V. J. Organic and E. A. Karcher Oct. 1983 38 p
(DA Proj. 1L1-62202-AH-85)
(AD-A134839; USAAVRADCOM-TR-83-E-2) Avail: NTIS HC A03/MF A01 CSCL 09/5

A microprocessor-controlled digital to video converter has been developed for low-level helicopter flight studies. The converter displays digitally generated contour maps in 8 or 16 shades of grey or 8 colors, aircraft symbology, and alphanumerics in a standard television format. Author (GRA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N84-17182# Naval Postgraduate School, Monterey, Calif.
VARIABLE AREA EJECTOR-DIFFUSER MODEL TESTS M.S. Thesis
T. H. Walsh Sep. 1983 122 p
(AD-A134843) Avail: NTIS HC A06/MF A01 CSCL 21/5

A modular variable area ejector-diffuser was constructed and tested to establish baseline characteristics that could be used for comparison of results obtained from potential geometric reconfiguration. F404 and TF30 engines (afterburning and non-afterburning modes) were modeled with a scale factor of 22.1. The diffuser-ejector had a cylindrical inlet duct (3.47 inch dia.) which transitioned at an L/D of 1.33 to a conical section with a half angle of 8 degrees for an overall length of 24.0 inches, and with a transplanting centerbody composed of four conical sections with differing includes angles. Maximum primary mass flow and total pressure for the F404 without afterburner (smallest engine modeled) were 0.43 lbm/sec. and 2.95 atmospheres. These same parameters for the TF30 with afterburner (largest engine modeled) were 1.74 lbm/sec. and 2.57 atmospheres. GRA

N84-17183# Daimler-Benz A. G., Stuttgart (West Germany). Zentrale Forschung.
CERAMIC COMPONENTS FOR GAS TURBINES, PHASE 2 Final Report
Eberhard Tienfenbacher, Herbert Girntke, Reinhart Heinz, Klaus D. Moergenthaler, Franz Neubrand, Wilfried Raeuchle, Manfred Stute, and Guenther Sulzbacher Bonn Bundesministerium fuer Forschung und Technologie Sep. 1983 162 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-198; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 33

Turbine rotors, turbine scrolls, recuperative heat exchangers, and chemical vapor deposition (CVD) are treated. Turbine rotors were manufactured by hot pressed silicon nitride (HPSN) and reaction bonded silicon nitride (RBSN) processes and were tested. A first turbine scroll and samples of a recuperative heat exchanger were tested. The development of chemical vapor deposition was concluded. During a 58 hr test run of the rotor, 60,000 r.p.m. at 1250 C and 50,000 r.p.m. at 1350 C are reached. The CVD layers show an extreme hardness and adhere well to RBSN and HPSN. Author (ESA)

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N84-17184*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WIND-TUNNEL FREE-FLIGHT INVESTIGATION OF A MODEL OF A FORWARD-SWEPT-WING FIGHTER CONFIGURATION
Daniel G. Murri, Luat T. Nguyen, and Sue B. Grafton Feb. 1984 71 p refs
(NASA-TP-2230; L-15602; NAS 1.60:2230) Avail: NTIS HC A04/MF A01 CSCL 01C

A wind-tunnel free-flight investigation was conducted to study the dynamic stability characteristics of a model of a forward-swept-wing fighter-airplane configuration at high angles of attack. Various other wind-tunnel techniques employed in the study included static- and dynamic- (forced-oscillation) force tests, free-to-roll tests, and flow-visualization tests. A unique facet of the study was the extreme level of static pitch instability (in excess of negative 32-percent static margin) inherent in the airframe design which precluded free-flight testing without stability augmentation in pitch. Results are presented which emphasize the high-angle-of-attack aerodynamics and the vehicle-component contributions to these characteristics. The effects of these aerodynamic characteristics on the high-angle-of-attack flying qualities of the configuration are discussed in terms of results of the wind-tunnel free-flight tests. Author

N84-17185*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN ON-LINE EQUIVALENT SYSTEM IDENTIFICATION SCHEME FOR ADAPTIVE CONTROL Ph.D. Thesis - Stanford Univ.
Steven Mark Sliwa Jan. 1984 173 p refs
(NASA-TM-85737; NAS 1.15:85737) Avail: NTIS HC A08/MF A01 CSCL 01C

A prime obstacle to the widespread use of adaptive control is the degradation of performance and possible instability resulting from the presence of unmodeled dynamics. The approach taken is to explicitly include the unstructured model uncertainty in the output error identification algorithm. The order of the compensator is successively increased by including identified modes. During this model building stage, heuristic rules are used to test for convergence prior to designing compensators. Additionally, the recursive identification algorithm as extended to multi-input, multi-output systems. Enhancements were also made to reduce the computational burden of an algorithm for obtaining minimal state space realizations from the inexact, multivariate transfer functions which result from the identification process. A number of potential adaptive control applications for this approach are illustrated using computer simulations. Results indicated that when speed of adaptation and plant stability are not critical, the proposed schemes converge to enhance system performance. S.L.

N84-17186*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
IMAGES: A DIGITAL COMPUTER PROGRAM FOR INTERACTIVE MODAL ANALYSIS AND GAIN ESTIMATION FOR EIGENSYSTEM SYNTHESIS
Ruben L. Jones Feb. 1984 47 p refs
(NASA-TM-85690; L-15655; NAS 1.15:85690) Avail: NTIS HC A03/MF A01 CSCL 01C

An interactive digital computer program for modal analysis and gain estimation for eigensystem synthesis was written. Both mathematical and operation considerations are described; however, the mathematical presentation is limited to those concepts essential to the operational capability of the program. The program is capable of both modal and spectral synthesis of multi-input control systems. It is user friendly, has scratchpad capability and dynamic memory, and can be used to design either state or output feedback systems. S.L.

N84-17187# Developmental Sciences, Inc., City of Industry, Calif.
DESIGN OF A REMOTELY CONTROLLED HOVERCRAFT VEHICLE FOR SPILL RECONNAISSANCE Final Report, Aug. 1977 - Mar. 1979
Henry Gustafson (City of Oxnard Fire Dept.), Ray Furr (City of Oxnard Fire Dept.), Keith Souter, and Gerald Seeman Nov. 1983 47 p
(Contract EPA-R-8053365)
(PB84-124064; EPA-600/2-83-116) Avail: NTIS HC A03/MF A01 CSCL 01C

This program was undertaken to prepare a conceptual design for a practical prototype of a remotely-controlled reconnaissance vehicle for use in hazardous material spill environment. Data from past hazardous material spill were analyzed to determine the type of vehicle best suited for the reconnaissance duty and the vehicle's performance standards. Based on the environmental conditions

present at a typical spill, the desired vehicle capabilities, and the level of operated skill that could reasonably be expected, the vehicle selected was a ground effect machine or hovercraft. A skirted hovercraft design was chosen over a peripheral-jet design because of power requirements. Author (GRA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N84-17188 British Library Lending Div., Boston Spa (England).
EXPERIMENTAL WATER TUNNEL WITH DENSITY STRATIFICATION FOR THE SIMULATION OF SMALL-SCALE ATMOSPHERIC FLOWS
Michel Perrier 2 Dec. 1983 20 p Transl. into ENGLISH of "Veine Hydraulique Experimentale a Stratification en Densite Destinee a la Simulation des Ecoulements Atmospheriques a Petite Echelle" rept. No. 23 Ministere des Transports, Direction de la Meteorologie, France, Jan. 1982
(BLL-Risley-Tr-4871-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

An experimental water tunnel with density stratification for the simulation of small scale atmospheric flows is described. The essential characteristics of this tunnel and its principle of operation are discussed. R.J.F.

N84-17189*# Virginia Associated Research Center, Newport News.
TWINTN4: A PROGRAM FOR TRANSONIC FOUR-WALL INTERFERENCE ASSESSMENT IN TWO-DIMENSIONAL WIND TUNNELS Final Report
William B. Kemp, Jr. Washington, D.C. NASA Feb. 1984 48 p refs
(Contract NCC1-69)
(NASA-CR-3777; NAS 1.26:3777) Avail: NTIS HC A03/MF A01 CSCL 14B

A method for assessing the wall interference in transonic two-dimensional wind tunnel tests including the effects of the tunnel sidewall boundary layer was developed and implemented in a computer program named TWINTN4. The method involves three successive solutions of the transonic small disturbance potential equation to define the wind tunnel flow, the equivalent free air flow around the model, and the perturbation attributable to the model. Required input includes pressure distributions on the model and along the top and bottom tunnel walls which are used as boundary conditions for the wind tunnel flow. The wall-induced perturbation field is determined as the difference between the perturbation in the tunnel flow solution and the perturbation attributable to the model. The methodology used in the program is described and detailed descriptions of the computer program input and output are presented. Input and output for a sample case are given. Author

N84-17190# Dayton Univ., Ohio. Research Inst.
AIRCREW TRAINING DEVICES: UTILITY AND UTILIZATION OF ADVANCED INSTRUCTIONAL FEATURES. PHASE I: TACTICAL AIR COMMAND Interim Report, Mar. - Dec. 1982
D. J. Polzella Brooks AFB, Tex. Air Force Human Resources Lab. Nov. 1983 76 p
(Contract F33615-81-C-0005; AF Proj. 1123)
(AD-A135052; AFHRL-TR-83-22) Avail: NTIS HC A05/MF A01 CSCL 05/9

An Aircrew Training Device (ATD) is not merely a flight simulator. It is also equipped with sophisticated hardware and software capabilities, known as advanced instructional features (AIFs), that permit a flight crew instructor to control, monitor, and record flight simulation training sessions. A survey conducted at five of the principal Tactical Air Command ATD sites revealed that few instructors receive extensive training in AIF use and that most features are not used very often. Several factors appear to have contributed to the low rate of AIF use. These factors include hardware and/or software unreliability, time-consuming implementation, functional limitations, and design deficiencies. Although many AIFs were judged to have significant value in replacement and/or continuation training, some features need to be made more reliable and user-friendly before their training effectiveness can be ascertained. It was recommended that a more formalized intensive training program for ATD instructors be established. Such a program would not only teach instructors how to use AIFs but, more importantly, how to use them effectively. Author (GRA)

N84-17191# Dayton Univ., Ohio. Research Inst.
INSTRUCTOR STATION DISPLAY FOR USE IN T-37 FLIGHT SIMULATION TRAINING Final Technical Paper
H. D. Warner Brooks AFB, Tex. Air Force Human Resources Lab. Oct. 1983 86 p
(Contract F33615-81-C-0005; AF Proj. 1123)
(AD-A134854; AFHRL-TP-83-38) Avail: NTIS HC A05/MF A01 CSCL 05/8

This study produced the design for an integrated visual display for the instructor/operator station (IOS) of the Advanced Simulator for Pilot Training (ASPT). The study was accomplished in two steps. First, a survey of T-37 instructor pilots (IPs) was conducted to define the information requirements for an ASPT IOS integrated visual display for use in T-37 undergraduate pilot training. A questionnaire was developed and used in the survey. It contained a comprehensive listing of flight information items, and the IP subjects were asked to rate each item in terms of the requirements for use in the display. The questionnaire rating data were statistically analyzed to determine which items should be retained for inclusion in the display and which items could be eliminated. In the second step of the study, display symbology was determined for each item retained using MIL-STD-884C and other relevant design specifications, and three integrated display modes of operation were designed. Each display mode design incorporates various display symbols to provide the required display information. Author (GRA)

N84-17192# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
SAPIENS MEMO 5: THE MECHANICAL DESIGN OF THE EMP-SIMULATOR SAPIENS
Sven Garmland Jun. 1983 39 p In SWEDISH; ENGLISH summary
(FOA-C-30320-A3; ISSN-0347-3708) Avail: NTIS HC A03/MF A01; Research Inst. of National Defence, Stockholm KR 50

The mechanical design of a bounded-wave type simulator, which generates a high strength field in the operation volume, without soil reflection, while the field is weak in the surroundings is described. The simulator is of a modified parallel-plane type. The antenna is made up of a triangular net, 50 m long and max. 12 m wide, set over the ground surface which is covered with a galvanized net. Author (ESA)

N84-18088*# Massachusetts Inst. of Tech., Cambridge.
FLOW BEHAVIOR IN THE WRIGHT BROTHERS FACILITY Final Report
Stephen Genn *In its* A Coop. Program to Stimulate Student Involvement through the MIT Undergraduate Research Opportunity Program Jan. 1984 42 p (For primary document see N84-18086 08-80)
(WBWT-TR-1187) Avail: NTIS HC A05/MF A01 CSCL 01A

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N84-17193# Committee on Science and Technology (U. S. House).
REVIEW OF MATERIALS PROCESSING IN SPACE, 1983
Washington, D.C. GPO 1984 133 p Hearings before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., no. 42, 14-15 Sep. 1983
(GPO-27-914) Avail: Subcommittee on Space Science and Applications

Materials processing in space is covered. Program management is addressed. The applications of microgravity are considered. N.W.

N84-17194# Committee on Science and Technology (U. S. House).
SPACE COMMERCIALIZATION
Gordon A. Smith Washington, D.C. GPO 1983 39 p Rept. presented by the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., Oct. 1983
(GPO-26-498) Avail: Subcommittee on Space Science and Applications

The results of four space commercialization hearings held by the Subcommittee on Space Science and Applications in May, 1983 are presented. The broad topics that characterize space commercial ventures, and the need for any institutional and organizational changes in order to encourage commercialization are addressed. The commercialization of launch vehicles is discussed. Author

N84-17195*# Old Dominion Univ., Norfolk, Va. Dept. of Electrical Engineering.
INVESTIGATION OF DESIGN CONSIDERATIONS FOR A COMPLEX DEMODULATION FILTER Final Report, 6 Jun. - 6 Sep. 1979
J. W. Stoughton Jan. 1984 14 p refs
(Grant NAS1-15648)
(NASA-CR-173295; NAS 1.26:173295) Avail: NTIS HC A02/MF A01 CSCL 22A

The digital design of an adaptive digital filter to be employed in the processing of microwave remote sensor data was developed. In particular, a complex demodulation approach was developed to provide narrow band power estimation for a proposed Doppler scatterometer system. This scatterometer was considered for application in the proposed National Oceanographic survey satellite, on an improvement of SEASAT features. A generalized analysis of complex diagrams for the digital architecture component of the proposed system. S.L.

N84-17196*# Intermetrics, Inc., Huntsville, Ala.
SEPAC: SPACELAB MISSION 1 REPORT
23 Dec. 1983 41 p
(Contract NAS8-34747)
(NASA-CR-170980; NAS 1.26:170980; IR-AL-017) Avail: NTIS HC A03/MF A01 CSCL 05B

The SEPAC Spacelab Mission 1 activities relevant to software operations are reported. Spacelab events and problems that did not directly affect SEPAC but are of interest to experimenters are included. Spacelab Mission 1 was launched from KSC on 28 November 1983 at 10:10 Huntsville time. The Spacelab Mission met its objectives. There were two major problems associated with SEPAC: the loss of the EBA gun and the RAU 21. N.W.

N84-17197# National Defense Univ., Washington, D. C.
THE NATIONAL SPACE PROGRAM FROM THE FIFTIES INTO THE EIGHTIES
C. Schichtle 1983 133 p
(AD-A134799; NATL-SEC-AFFAIRS-MONO-83-6) Avail: NTIS HC A07/MF A01 CSCL 22/1

This monograph traces the National Space Program and its confusing history from the 1950s to the 1980s. Its focus is the Government agencies charged with leading this nation's public and military programs, the National Aeronautics and Space Administration (NASA) and the Department of Defense (DOD), respectively. Although the legal role each agency plays can be found in the Space Act of 1958, the programs each pursues are most governed by national space policy. Thus, the central theme of this work is civilian and military space policies and the organizational changes that have been required to implement them. The introduction and chapter 1 review events and influences that have been part of the complex space policy formulation process. Chapter 2 presents a rather detailed evolution of the National Space Program through past administrations for an understanding that is essential to put current issues into proper perspective. To keep this work unclassified, there is no mention of the intelligence community's space work, and program-specific data on military space systems are kept to a minimum. GRA

N84-17198# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
PREVENTIVE MAINTENANCE ON SPACE SYSTEMS M.S. Thesis
J. Mariotti, Jr. Sep. 1983 93 p
(AD-A134955; AFIT-LSSR-45-83) Avail: NTIS HC A05/MF A01 CSCL 15/5

With the advent of an operational Space Transportation System, many opportunities for activities in space exist. Maintenance of on-orbit satellite systems is one such application. Planners need techniques to evaluate the appropriate maintenance category; i.e., whether a preventive maintenance program is feasible or should a corrective maintenance scheme be applied. This study demonstrates a simple yet technically accurate graphical estimating methodology, known as the Total-Time-on-Test plot. Specifically, using this technique in conjunction with on-orbit life data from Traveling Wave Tube Assemblies located aboard second generation Defense Satellite Communications System (DSCS-2) and North Atlantic Treaty Organization Phase 3 (NATO 3) satellites, preventive maintenance on these items is shown not to be the method of choice. Further, techniques are demonstrated for determining estimated optimal maintenance intervals using failure and repair costs should preventive maintenance be demonstrated as a feasible maintenance category. Author (GRA)

N84-17199# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN INVESTIGATION OF NON-EXTRAVEHICULAR ACTIVITY (NON-EVA) ON-ORBIT MAINTENANCE SUPPORT CONCEPTS FOR ORBITING SYSTEMS M.S. Thesis
R. A. Aborn Sep. 1983 65 p
(AD-A134957; AFIT-LSSR-86-83) Avail: NTIS HC A04/MF A01 CSCL 22/2

Designing highly reliable, expendable satellites for long duration, on-orbit missions is becoming increasingly impractical. Incorporating a maintainability aspect is one way of facilitating the required level of probability of mission success. A hypothetical satellite constellation, Space Fox, is discussed in identifying the 'design to build' criteria, technical capabilities, and economic considerations necessary to facilitate NON-EVA on-orbit maintenance repair concepts. The acquisition cycle provides a vehicle for showing the relationship between the maintenance concept and maintenance plan, and developing a system to include NON-EVA on-orbit repair capabilities. Specific levels of concept design, technical limitations and economic trade-offs are identified. System optimization and prime equipment compatibility are addressed. NON-EVA on-orbit maintenance by a pivoting arm mechanism servicer, carried by the Teleoperator Manuevering System, is a technically and economically feasible way of supporting orbiting space assets. A recommendation to develop an implementation plan, reliability simulation and stimulate funding for further research and development of the design engineering and technical advances required is represented. Author (GRA)

N84-17200# Committee on Space Research, Berne (Switzerland).
SPACE RESEARCH IN SWITZERLAND Annual Report
1982 23 p refs Presented to COSPAR Sponsored by Swiss

National Science Foundation
Avail: NTIS HC A02/MF A01

Swiss participation in ESA and NASA middle atmosphere, magnetosphere, solar wind, lunar geology, solar constant, astronomy, Earth resources, climatology, life science, and Halley's comet programs is summarized. Sounding rocket, balloon, radio-astronomy, IUE satellite, LANDSAT, SEASAT, and Hipparchos satellite experiments are described. Author (ESA)

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N84-17201# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RE-ENTRY AND SIMULATION
H. Jian and X. Guangming 9 Nov. 1983 12 p Transl. into ENGLISH from Hangkong Zhishi (China), no. 5, May 1983 p 26-27
(AD-A135515; FTD-ID(RS)T-1425-83) Avail: NTIS HC A02/MF A01 CSCL 16/2

The physics of re-entry are discussed with emphasis on the re-entry trajectory of a ballistic missile. Factors discussed include re-entry speed, ablation, aerodynamic heating, and the plasma sheath shield. Experimental techniques used to simulate the aerodynamics and performance of missile systems include the computer, the wind tunnel, and free flight. Each of these is briefly discussed. J.M.S.

N84-17202# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Nachrichtensysteme.
CARRIER ACQUISITION AND TRACKING BY A COSTAS-LOOP WITH AUTOMATIC FREQUENCY CONTROL
Ernst Messerschmid Jun. 1983 63 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-838)
(DFVLR-FB-83-24) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 22

The use of automatic frequency control (AFC) in a Costas Loop is studied. The AFC control characteristics for phase shift keying modulated nonreturn-to-zero signals, as well as the corresponding acquisition times, were derived for passive lowpass filters. Signal tracking of the composite Costas/AFC Loop was analyzed. Shorter acquisition times and greater acquisition ranges are obtained. False carrier locking at data sidebands is avoided. The AFC block can be switched off after acquisition to improve tracking quality. Author (ESA)

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N84-17203*# Engineering and Economics Research, Inc., Vienna, Va.
AN ATTACHED PAYLOAD OPERATIONS CENTER (APOC) AT THE GODDARD SPACE FLIGHT CENTER (GSFC), VOLUME 2 Final Report
Dec. 1983 40 p 2 Vol.
(Contract NAS5-26962)
(NASA-CR-175160-Vol-2; NAS 1.26:175160-Vol-2) Avail: NTIS HC A03/MF A01 CSCL 14B

An overview of the APOC is given. For Spacelab payloads channel 2 and 3 data are input via a Statistical Multiplexer (SM) to the various SIPS functions. These include recording of the data on High Density Recorders (HDR), DQM and demultiplexing of the composite data stream by the High Rate Demultiplexer (HRDM). This system performs the inverse functions of the onboard Spacelab High Rate Multiplexer (HRM) enabling access to the data streams as multiplexed onboard the Spacelab. The contents and characteristics of channels one, two and three data as downlinked by the Tracking and Data Relay Satellite System (TDRSS) ku-band are given. Author

N84-17204# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE OCEANGOING SPACE SURVEY SHIP, THE WANG YUAN
W. Jinzhong 9 Nov. 1983 14 p Transl. into ENGLISH from Kexue Shiyan (China), no. 3, Mar. 1983 p 1-3
(AD-A135514; FTD-ID(RS)T-1454-83) Avail: NTIS HC A02/MF A01 CSCL 13/10

A description of the space survey ship Wang Yuan is given. The duties of the ship are to track and survey the satellites and missiles. The instruments used to achieve the duties of the ship are also described. J.M.S.

N84-17205# Air Force Armament Lab., Eglin AFB, Fla.
PROJECT DELUGE: THE DEVELOPMENT OF A HOLLOMAN HIGH SPEED TEST TRACK HEAVY RAINFIELD Final Report, Jul. 1982 - Jun. 1983
J. A. Shipe 1 Jun. 1983 105 p
(AF Proj. TKG0)
(AD-A134810; AD-TR-83-42) Avail: NTIS HC A06/MF A01 CSCL 04/2

The report describes the development of a Holloman High Speed Test Track artificial rainfield with a drop mass median diameter of approximately 2.7 millimeters and an accumulated rain rate of 20-30 inches per hour. An overview of the physical layout, test set-up, and test instrumentation is given. Drop number distributions over eight size categories from .3 to 5.1 millimeters are presented, as well as equivalent and accumulated rain rate, liquid water content, and mass median diameter data. Also included are statistics for estimation of the number and size of drops encountered by a test item passing through the rainfield. Author (GRA)

N84-17206# Air Force Weapons Lab., Kirtland AFB, N. Mex.
SOIL CHARACTERIZATION AND EVALUATION AT WHITE SANDS MISSILE RANGE, NEW MEXICO Final Report
E. L. Miller and R. J. Majka Oct. 1983 206 p
(AF Proj. 672-A)
(AD-A134820; AFWL-TR-83-97) Avail: NTIS HC A10/MF A01 CSCL 08/13

A complete site characterization of the subsoil conditions down to 10 meters (32 feet) was conducted at White Sands Missile Range, New Mexico. This included testing 54 borehole samples and 6 trench bulk samples for grain-size distribution Atterberg Limits, natural and hygroscopic moisture contents, moisture contents, and specific gravities. Trench bulk samples were also tested for Standard Proctor maximum dry densities and optimum water contents, unconfined compressive strengths, and triaxially-confined compressive strengths. Additional tests were performed in the field to include downhole nuclear density gauge measurements, standard penetration tests, and seismic refraction surveys. Atomic Absorbance tests and X-ray diffraction tests were conducted in the laboratory to determine concentrations and nature of calcium and magnesium in the soil. Correlations between strength values and cementation of soil particles was established as well as correlations between strength properties and seismic refraction measurements. GRA

N84-17207# Air Force Armament Lab., Eglin AFB, Fla.
PROJECT DELUGE: A PROPOSED MATHEMATICAL MODEL FOR THE HOLLOMAN AFB TEST TRACK SIMULATED RAINFIELD Final Report, May 1982 - May 1983
C. B Evans and W. L. Gilliam 1 Jul. 1983 16 p

(AD-A134891; AD-TR-83-46) Avail: NTIS HC A02/MF A01 CSCL 14/2

This report relates the characteristics of the Holloman High Speed Test Track's simulated rainfield to those of a natural rainfield as defined by mathematical models propogated by other experiments. Data collected for heavy rain rates (25-30 in/hour) generated for Project Deluge in a controlled environment are analyzed and a tentative mathematical model relating the key parameters is provided. This report specifies the additional efforts required to finalize the model. Author (GRA)

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N84-17208 Academy of Sciences (USSR), Moscow. Space Research Inst.

EFFECTS OF SMALL-SCALE PLASMA DISTURBANCE ON THE IKB-1300 SPACECRAFT POTENTIAL

V. M. Balebanov, L. Bankov (Central Lab. for Space Research, BAN, Sofia, Bulgaria), A. Bochev (Central Lab. for Space Research, BAN, Sofia, Bulgaria), S. Chapkanov (Central Lab. for Space Research, BAN, Sofia, Bulgaria), G. L. Gdalevich, V. F. Gubsky, Z. Dachev (Central Lab. for Space Research, BAN, Sofia, Bulgaria), E. M. Dubinin (Central Lab. for Space Research, BAN, Sofia, Bulgaria), R. Koleva (Central Lab. for Space Research, BAN, Sofia, Bulgaria), and I. Kutiev 1983 23 p refs Presented at the 34th Congr. of the Intern. Astronautical Federation, Budapest, 10-15 Oct. 1983

(PR-839; IAF-83-220) Copyright. Avail: Issuing Activity

The potential of the Intercosmos-Bulgaria-1300 satellite launched to the circular orbit at an altitude - 900 km, was measured. The potential was equalized along the satellite surface. The satellite was covered with a conducting screen and the solar cells were covered with a metal coating. The satellite potential varied slightly along the trajectory and in the typical case it was -2 B that corresponds to 5kTe/e. As the satellite crossed the auroral zone the small scale fluctuations of plasma and field parameters were recorded. In this region a sharp decrease of the satellite negative potential is often observed. In this case the potential variations correlate well with the increasing flux of energetic electrons. The observed variations can be explained by secondary electron emission from the satellite surface. S.L.

N84-17209 Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.

ROSAT-FI DESIGN REVIEW

Sep. 1983 144 p Conf. held in Garching bei Munich, 19-20 Sep. 1983

(MPE-39; BR-ROS-ME-MA00/06; ISSN-0340-8922) Copyright. Avail: Issuing Activity

The Rosat X-ray, XUV astronomy satellite focal instrumentation design is reviewed. The STS launched satellite has an 83 cm X-ray telescope with three focal plane instruments, and a 58 cm XUV telescope with two focal plane instruments. Position sensitive proportional counter, mechanics, and electronics subsystems are described. High resolution imager interfaces are outlined. Quality control, product assurance, safety, integration and test plans and data facility are summarized. The satellite is designed for 6 months all sky surveying and 12 months pointed observations. Author (ESA)

N84-17210*# National Aeronautics and Space Administration, Washington, D. C.

A NEW DIMENSION IN SPACE EXPERIMENTATION

[1983] 12 p

(NASA-NF-140; NAS 1.20:140) Avail: NTIS HC A02/MF A01 CSCL 22B

Space experimentation, cosmic origins, the long-term effects of the space environment on living things, the long-term effects of space environment on materials and hardware, seeds in space, power generation in space, experimentation with crystals, and thermal control are discussed. Author

N84-17211*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

STEP EXPERIMENT REQUIREMENTS

M. Larry Brumfield, comp. Jan. 1984 347 p refs Workshop held in Hampton, Va., 28 Jun. - 1 Jul. 1983

(NASA-CP-2294; L-15733; NAS 1.55:2294) Avail: NTIS HC A15/MF A01 CSCL 22B

A plan to develop a space technology experiments platform (STEP) was examined. NASA Langley Research Center held a STEP Experiment Requirements Workshop on June 29 and 30 and July 1, 1983, at which experiment proposers were invited to present more detailed information on their experiment concept and requirements. A feasibility and preliminary definition study was conducted and the preliminary definition of STEP capabilities and experiment concepts and expected requirements for support services are presented. The preliminary definition of STEP capabilities based on detailed review of potential experiment requirements is investigated. Topics discussed include: Shuttle on-orbit dynamics; effects of the space environment on damping materials; erectable beam experiment; technology for development of very large solar array deployers; thermal energy management process experiment; photovoltaic concentrater pointing dynamics and plasma interactions; vibration isolation technology; flight tests of a synthetic aperture radar antenna with use of STEP. For individual titles, see N84-17212 through N84-17237.

N84-17212*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SPACE TECHNOLOGY EXPERIMENTS PLATFORM (STEP) OVERVIEW

Jack E. Harris *In its* STEP Expt. Requirements Jan. 1984 p 1-12 (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 22B

The Space Technology Experiments Platform (STEP) concept is summarized. It is shown that STEP is the enabling link between the research community and the space environment made accessible by the Space Transportation System (STS). The constituent elements of the research community are identified, the pertinent space environment attributes are listed, and the major guidelines applicable to establishing the specific STEP configuration are identified. E.A.K.

N84-17213*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

STEP MECHANICAL SYSTEMS

Obie H. Bradley, Jr. *In its* STEP Expt. Requirements Jan. 1984 p 13-34 (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 22B

The key elements in the STEP system are depicted including the Spacelab pallet, a modular interface structure, and pallet mounted electronics. Several concepts for potential experiments are illustrated. E.A.K.

N84-17214*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

STEP ELECTRONIC SYSTEM DESIGN

R. H. Couch and J. W. Johnson *In its* STEP Expt. Requirements Jan. 1984 p 35-46 (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 22B

The STEP electronic system design is discussed. The purpose of the design is outlined. The electronic system design is summarized and it is found that: an effective conceptual system design is developed; the design represents a unique set of capabilities; makes efficient use of available orbiter resources; the system capabilities exceed identified potential experiment needs. E.A.K.

N84-17215*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

STEP EXPERIMENT INTEGRATION
J. C. Moorman *In its* STEP Expt. Requirements Jan. 1984 p 47-54 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

The space technology experiments platform (STEP) integration was examined. Topics include: experiment design, fabrication, and assembly; experiment performance and environmental testing; STEP compatibility testing; STEP experiment integration; STS/payload requirements definition documentation. E.A.K.

N84-17216*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
SHUTTLE ON-ORBIT DYNAMICS **c16**
Stanley Fay *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 59-78 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

Shuttle on-orbit dynamics are outlined. Topics discussed include: on-orbit dynamic environment; on-orbit dynamic interaction; accelerated g-levels and sources; phase plane controller; maximum average RCS pulsing rate; maximum RCS accelerations; manual pulse mode; dynamic interaction; generic screening. E.A.K.

N84-17217*# Dayton Univ., Ohio. Research Inst.
THE EFFECTS OF THE SPACE ENVIRONMENT ON DAMPING MATERIALS AND DAMPING DESIGNS ON FLEXIBLE STRUCTURES **c39**
Matthew F. Kluesener *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 79-102 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 20K

The effects of space environments on damping materials and damping designs on flexible structures were investigated. The following items were examined: damping of flexible spacecraft appendages; composite loss factor (n sub s) vs. time in high vacuum for damped test beams and damping of flexible structures. The STEP experiments show inherent damping of flexible structures in space effective possible damping design configurations for space structures, effects of passively damped components on the system loss factor of flexible structures and the effect of space environment on properties of damping materials. E.A.K.

N84-17218*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DEPLOYABLE BEAM FLIGHT EXPERIMENT (MAST) **c18**
Brantley R. Hanks and John L. Allen, Jr. *In its* STEP Expt. Requirements Jan. 1984 p 103-120 ref (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

Improvement of technology of space systems control is discussed. Future space systems such as large antennas or a space station may have dimensions on the order of 30 m to 200 m, yet their basic structures may be relatively lightweight and flexible, making ground tests for loads, controls analyses, and design verifications questionable if not impossible. Abandoning the extensive ground test and analysis verification program that led to the success of previous spacecraft is not a sensible option; making it meaningful using current technology will require inefficient, ultraconservative structure and control designs. New test methods are outlined. E.A.K.

N84-17219*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ERECTABLE BEAM EXPERIMENT **c18**
Walter L. Heard, Jr. *In its* STEP Expt. Requirements Jan. 1984 p 121-134 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

The erectable beam applicability to the MAST/STEP experiment is summarized. High manual assembly rates were demonstrated in neutral buoyancy tests and it is suggested that use of an erectable beam would eliminate extension/retraction complexity associated with deployable beams. The erectable beam assembly aid is easily adaptable to general truss configurations and structural appendages could be accommodated with the use of actuators. The ACCESS flight experiment precedes MAST by 2 to 3 years and will provide mature, space proven assembly/disassembly technology on which to base the MAST experiment. E.A.K.

N84-17220*# Astro Research Corp., Carpinteria, Calif.
THE STEP/STACBEAM EXPERIMENT TECHNOLOGY DEVELOPMENT FOR VERY LARGE SOLAR ARRAY DEPLOYERS **c18**
Ron Samuels *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 135-146 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

The Stacking Triangular Articulated Compact Beam (STACBEAM) is discussed with reference to structural testing experiments afforded by ground simulation and the Space Technology Experiments Platform (STEP). The STACBEAM lends itself to a deployment technique which offers a radical improvement in flexible blanket solar array technology. A system for deployment and support of a solar array blanket is described which consists of the blanket, its containment structure, the support structure and its deployer, the blanket stiffening battens, and the deployable boom standoffs. In operation, the blanket is pulled out and supported by the STACBEAM which packages next to the folded blanket. Since the STACBEAM does not rotate during extension, complete control of the blanket is maintained during extension. Deployment of this system occurs one bay at a time in a sequential manner. The deployer provides sufficient rigidity so that beam stiffness is not degraded during the deployment process. M.G.

N84-17221*# Massachusetts Inst. of Tech., Cambridge. Space Systems Lab.
GENERAL REQUIREMENTS FOR SHUTTLE FLIGHT EXPERIMENTS **c16**
Edward F. Crawley *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 147-154 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22A

Requirements and guiding principles for flight space structures experiments are defined. Shuttle mid-deck experiments, Space Technology Experiments Platform (STEP) tests, and the EVA Assembly of Structures Experiment (EASE) are addressed. M.G.

N84-17222*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THERMAL ENERGY MANAGEMENT PROCESS EXPERIMENT
S. Ollendorf *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 161-163 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

The thermal energy management processes experiment (TEMP) will demonstrate that through the use of two-phase flow technology, thermal systems can be significantly enhanced by increasing heat transport capabilities at reduced power consumption while operating within narrow temperature limits. It has been noted that such phenomena as excess fluid puddling, priming, stratification, and surface tension effects all tend to mask the performance of two-phase flow systems in a 1-g field. The flight experiment approach would be to attack the experiment to an appropriate mounting surface with a 15 to 20 meter effective length and provide a heat input and output station in the form of heaters and a radiator. Using environmental data, the size, location, and orientation of the experiment can be optimized. The approach would be to provide a self-contained panel and mount it to the STEP through a frame. A small electronics package would be developed to interface with the STEP avionics for command and data handling. During the flight, heaters on the evaporator will be exercised to determine performance. Flight data will be evaluated against the ground tests to determine any anomalous behavior. M.G.

N84-17223*# Department of Communications, Ottawa (Ontario). Space Technology and Applications Branch.

CANADIAN ATTITUDE SENSING EXPERIMENTAL PACKAGE (CASEP)
A. H. Reynaud *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 165-176 ref (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

The Canadian Attitude Sensing Experiment Package (CASEP) was designed to demonstrate and verify the operation of an attitude sensing subsystem prior to committing its use on an operational mission. Data telemetry/recording requirements, power and physical requirements, and mission requirements of the experiment package are defined. M.G.

N84-17224*# General Dynamics Corp., San Diego, Calif.
PHOTOVOLTAIC CONCENTRATOR POINTING DYNAMICS AND PLASMA INTERACTION STUDY c75
Theodore G. Stern *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 177-184 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 20I

The objectives of this experiment are to use the Space Technology Experiments Platform (STEP) system to demonstrate the viability of concentrator photovoltaic arrays by: (1) configuring a deployable mast on the STEP pallet with concentrator mass models and some active photovoltaic modules; (2) measuring the array pointing dynamics under normal rotation as well as disturbance conditions; (3) performing an array plasma interaction experiment to determine the steady-state plasma losses under various voltage conditions; and (4) providing active distributed control of the support truss to determine the improvement in dynamic response. Experiment approach and test control and instrumentation are described. M.G.

N84-17225*# Rockwell International Corp., Seal Beach, Calif. Shuttle Integration and Satellite Systems Div.
LOW CONCENTRATION RATIO SOLAR ARRAY STRUCTURAL CONFIGURATION c44
S. J. Nalbandian *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 185-198 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 10A

The design and structural properties of a low concentration ratio solar array are discussed. The assembled module consists of six interconnected containers which are compactly stowed in a volume of 3.24 m(3) for delivery to orbit by the shuttle. The containers deploy in accordian fashion into a rectangular area of 19.4 x 68 meters and can be attached to the user spacecraft along the longitudinal centerline of the end container housing. Five rotary incremental actuators requiring about 8 watts each will execute the 180-degree rotation at each joint. Deployable masts (three per side) are used to extend endcaps from the housing in both directions. Each direction is extended by three masts requiring about 780 watts for about 27 minutes. Concentrator elements are extended by the endcaps and are supported by cable systems that are connected between the housings and endcaps. These power generating elements contain reflector panels which concentrate light onto the solar panels consisting of an aluminum radiator with solar cells positioned within the element base formed by the reflectors. A flat wire harness collects the power output of individual elements for transfer to the module container housing harnesses. M.G.

N84-17226*# Rockwell International Corp., Downey, Calif. Shuttle Integration and Satellite Systems Div.
DEVELOPMENT OF TEST ARTICLE BUILDING BLOCK (TABB) FOR DEPLOYABLE PLATFORM SYSTEMS
H. S. Greenberg and R. T. Barbour *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 199-210 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

The concept of a Test Article Building Block (TABB) is described. The TABB is a ground test article that is representative of a future building block that can be used to construct LEO and GEO deployable space platforms for communications and scientific payloads. This building block contains a main housing within which the entire structure, utilities, and deployment/retraction mechanism are stowed during launch. The end adapter secures the foregoing components to the housing during launch. The main housing and adapter provide the necessary building-block-to-building-block attachments for automatically deployable platforms. Removal from the shuttle cargo bay can be accomplished with the remote manipulator system (RMS) and/or the handling and positioning aid (HAPA). In this concept, all the electrical connections are in place prior to launch with automatic latches for payload attachment provided on either the end adapters or housings. The housings also can contain orbiter docking ports for payload installation and maintenance. M.G.

N84-17227*# Rockwell International Corp., Downey, Calif. Shuttle Integration and Satellite Systems Div.
A DEPLOYABLE STRUCTURE AND SOLAR ARRAY CONTROLS EXPERIMENT FOR STEP
T. S. Nishimoto *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 211-220 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

A candidate configuration for a controls experiment on the Space Technology Experiments Platform (STEP) is described. The elements of the experiment are the mast, the solar array, and an articulation module between the two. The characteristic dimensions are very compatible for integration on a pallet such a STEP's proposed configuration. The controls' objective would be the measurement of orbiter interaction as well as the system identification of the appendages. The flight experiment configuration would also provide a test bed for various active vibration controls concepts. The instrumentation being considered would measure accelerations, strains, displacements, and temperatures. The deployable mast has eight elements defining a structural bay. Uniaxial measurements would be required to define loads at a cross section of the structure. Displacements due to thermal distortion of the mast and the local state of the solar concentrator may be measured by an optical ranging technique from the orbiter aft flight deck. M.G.

N84-17228*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
VIBRATION ISOLATION TECHNOLOGY EXPERIMENT
Claude R. Keckler *In its* STEP Expt. Requirements Jan. 1984 p 221-230 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

The objectives of the vibration isolation technology experiment are to demonstrate the viability of the magnetic suspension technology in providing the isolation of large structures elements from the external environment and to quantify the degree of isolation provided by this system. The approach proposed for this experiment is to mount a six-degrees-of-freedom magnetic bearing suspension system at the free end of a shuttle-attached flexible structure such as MAST. The disturbance generator, located on top of the isolation system, will be energized at selected and broadband frequencies to simulate a typical spacecraft vibration environment. Sensors located on the isolation system and the flexible structures element will be used to quantify the degree of isolation provided by this system. M.G.

N84-17229*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INTEGRATED POWER/ATTITUDE CONTROL SYSTEM (IPACS) TECHNOLOGY EXPERIMENT c18
Claude R. Keckler *In its* STEP Expt. Requirements Jan. 1984 p 231-240 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

An experiment is proposed that will perform the tasks associated with the control and energy storage/power generation functions attendant to space operations. It was shown in past studies that the integration of these functions into one system can result in significant weight, volume, and cost savings. The

Integrated Power/Attitude Control System (IPACS) concept is discussed. During orbit day, power is derived from the solar cell arrays and, after appropriate conditioning, is used to operate the spacecraft subsystems, including the control system. In conventional approaches, a part of the collected solar energy is stored in a bank of batteries to permit operation of the vehicle's systems during orbit night. In the IPACS concept, the solar energy is stored in the spinning flywheels of the control system in the form of kinetic energy. During orbit night, the wheels are despun and, through the use of a wheel-shaft mounted generator, power is generated for the onboard subsystems. Operating these flywheels over a 50-percent speed variation permits the extraction of 75 percent of the stored energy while at the same time preserving 50 percent of the momentum capacity for control of the vehicle. Batteries can therefore be eliminated and significant weight and volume savings realized. R.J.F.

N84-17230*# General Electric Co., Philadelphia, Pa. Space Systems Div.

INVESTIGATION OF ARTICULATED PANEL DYNAMICS

Clyde V. Stahle, Jr. *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 241-255 (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 22B

An articulated panel dynamics experiment to evaluate present analysis and ground test methods as well as damping effectiveness is proposed. The experiment uses an existing panel design which was extensively analyzed and tested. These data provide a firm basis for evaluating the adequacy of panel analysis and ground test methodology. The key issues for future large space structure panel designs are addressed: the critical launch transient and vibroacoustic loading; the deployment analysis adequacy including air and gravitational effects; and the orbital resonant frequencies and mode shapes of deployed panel assemblies. By using an existing mature design that was thoroughly tested, the effort can focus on correlation of actual flight results with existing predictions. A second panel assembly incorporating passive damping is proposed to provide a direct measure of damped panel benefits that can be obtained. These benefits include: reduced launch loads and responses; and highly damped deployed modes. Existing space-qualified viscoelastic epoxy, in combination with composite materials or an alternate more effective damping material, will be used. R.J.F.

N84-17231*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.

STEP FLIGHT EXPERIMENTS LARGE DEPLOYABLE REFLECTOR (LDR) TELESCOPE c89

F. C. Runge *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 257-278 (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 03A

Flight testing plans for a large deployable infrared reflector telescope to be tested on a space platform are discussed. Subsystem parts, subassemblies, and whole assemblies are discussed. Assurance of operational deployability, rigidization, alignment, and serviceability will be sought. R.J.F.

N84-17232*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LARGE DEPLOYABLE ANTENNA FLIGHT EXPERIMENT FOR THE SPACE TECHNOLOGY EXPERIMENTS PLATFORM (STEP) c18

B. C. Tankersly (Harris Corp.) and Thomas G. Campbell *In its* STEP Expt. Requirements Jan. 1984 p 279-300 (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 22B

Spaceborne experiments to test the deployment reliability of large space antennas are discussed. Retraction, reflector surface tolerance, thermal distortion, electromagnetic performance, and dynamic controls are discussed. R.J.F.

N84-17233*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE 55-METER-STRUCTURE FLIGHT EXPERIMENT c18

John A. Garba, Robert Freeland, Ben K. Wada, Kirk J. OKeefe (Lockheed Missile and Space Co., Sunnyvale, Calif.), and Art Woods (Lockheed Missile and Space Co., Sunnyvale, Calif.) *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 301-310 (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 22B

The verification and demonstration of the structural performance related parameters for large flexible space structures are discussed. The objectives are to verify the deployment repeatability of static surface contour, to demonstrate the feasibility of in-flight static shape correction, to verify predicted shape in a zero gravity thermal environment, to determine zero gravity structural dynamic characteristics, and to verify the instrumentation and excitation system for in-flight measurements. R.J.F.

N84-17234*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

LARGE INFLATED-ANTENNA SYSTEM c18

W. F. Hinson and L. S. Keafer *In its* STEP Expt. Requirements Jan. 1984 p 311-324 refs (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 22B

It is proposed that for inflatable antenna systems, technology feasibility can be demonstrated and parametric design and scalability (scale factor 10 to 20) can be validated with an experiment using a 16-m-diameter antenna attached to the Shuttle. The antenna configuration consists of a thin film cone and paraboloid held to proper shape by internal pressure and a self-rigidizing torus. The cone and paraboloid would be made using pie-shaped gores with the paraboloid being coated with aluminum to provide reflectivity. The torus would be constructed using an aluminum polyester composite that when inflated would erect to a smooth shell that can withstand loads without internal pressure. R.J.F.

N84-17235*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ADAPTIVE MICROWAVE REFLECTOR c32

J. W. Goslee *In its* STEP Expt. Requirements Jan. 1984 p 325-331 ref (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 20N

As an interim step in going to the 100-meter reflector that was evaluated, a 5-meter reflector is proposed to test the electrostatic concept under space conditions. Some of the issues which require the space environment for evaluation are the following questions: Can deployment of a box ring structure with a thin film reflector attached be manually deployed? In the absence of humidity, can a 0.3-mil aluminized Kapton film reflector be formed by the electrostatic process suitable for antenna applications? Can the photogrammetric process be used to evaluate the reflector surface with pictures taken from the payload handling station? Can the space charging effect be evaluated with the 5-meter reflector attached to the Shuttle? Does the outgassing of moisture from 0.3-mil Kapton film affect its reflector capability? A box ring truss support structure and an automatic sequence deployment system are discussed. R.J.F.

N84-17236*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MICROWAVE REFLECTOR CHARACTERIZATION USING SIMPLE INSTRUMENTS IN EVA c32

J. W. Goslee *In its* STEP Expt. Requirements Jan. 1984 p 333-338 (For primary document see N84-17211 08-15)

Avail: NTIS HC A15/MF A01 CSCL 20N

An antenna with rigid panels which can be measured under ground conditions, carried to space in a packaged condition, deployed into a form similar to the Earth-measured one, measured under space conditions, restowed, and brought back to Earth so that the original measurements can be verified is the type being proposed for this experiment. The antenna chosen will be measured

under ground conditions, carried aloft, deployed into its antenna shape, lifted by the remote manipulator system to a position where it can be sighted by two astronauts at the two theodolites, and held there until the surface characterization can be completed. An alternate method would be to use photogrammetry and take pictures of the surface from the payload handling station. After the surface characterization is completed, the antenna will be folded and restowed into the Shuttle bay for return to Earth. The surface characterization will be repeated on Earth after its return for verification both of the original measurement taken on Earth and the measurement taken in space. R.J.F.

N84-17237*# Department of Communications, Ottawa (Ontario). Directorate of Space Mechanics.
FLIGHT TEST OF A SYNTHETIC APERTURE RADAR ANTENNA USING STEP **c32**
D. G. Zimcik, F. R. Vigeron, and S. Ahmed *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 339-354 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 17I

To establish confidence in its overall performance, credible information on the synthetic aperture radar antenna's mechanical properties in orbit must be obtained. However, the antenna's size, design, and operating environment make it difficult to simulate operating conditions under 1-g Earth conditions. The Space Technology Experiments Platform (STEP) offers a timely opportunity to mechanically qualify and characterize the antenna design in a representative environment. The proposed experimental configuration would employ a half-system of the full-scale RADARSAT antenna which would be mounted on the STEP platform in the orbiter cargo bay such that it could be deployed and retracted in orbit (as shown in this figure). The antenna would be subjected to typical environmental exposures while an array of targets and sensors on the antenna support structure and reflecting surface are observed and monitored. In particular, the typical environments would include deployment and retraction, dynamic response to vehicle thruster or base exciter inputs, and thermal soak and transient effects upon entering or exiting Earth eclipse. The proposed experiment would also provide generic information on the properties of large space structures in space and on techniques to obtain the desired information. R.J.F.

N84-17238# Committee on Science and Technology (U. S. House).
TRANSFER OF CIVIL METEOROLOGICAL SATELLITES
Washington GPO 1983 4 p Rept. to accompany H. Con. Res. 168 presented by the Comm. on Sci. and Technol., 98th Congr., 1st Sess., 8 Nov. 1983
(H-Rept-98-509; GPO-31-006) Avail: US Capitol, House Document Room

This resolution is presented to halt the administration's effort to sell, or to issue a request for proposal to sell, the Nation's civil weather satellites. The Congress does not consider such a transfer to be in the National interest at the present time. S.L.

N84-17239*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACE PROCESSING APPLICATIONS ROCKET (SPAR) PROJECT, SPAR 9 Final Report
R. Poorman, comp. Jan. 1984 195 p refs
(NASA-TM-82549; JA-62; NAS 1.15:82549) Avail: NTIS HC A09/MF A01 CSCL 22B

SPAR 9 (R-17) payload configuration, rocket performance, payload support, science payload instrumentation, and payload recovery are discussed. Directional solidification of magnetic composites, directional solidification of immiscible aluminum-indium alloys, and comparative alloy solidification experiments are reported. N.W.

N84-17240# Bohan (Walter A.) Co., Park Ridge, Ill.
NAVY TACTICAL APPLICATIONS GUIDE. OPERATIONAL ENVIRONMENTAL SATELLITES. POLAR-ORBITING SATELLITES GEOSTATIONARY SATELLITES, SPACECRAFT, SENSORS, IMAGERY
R. W. Fett, W. A. Bohan, J. J. Bates, and S. L. Tipton Jun. 1983 93 p
(Contract N00228-82-C-6222; F59-553)
(AD-A135466; NEPRF-TR-83-02) Avail: NTIS HC A05/MF A01 CSCL 22/2

This volume user oriented sections on current operational satellite systems that describe imagery acquisition and distribution, sensor systems, and spectral characteristics. In addition, sample imagery is included for each of the meteorological satellite systems. GRA

N84-17241# Institut National de Recherche d'Informatique et d'Automatique, Rocquencourt (France).
VALIDATION METHODS FOR MATHEMATICAL MODELS OF FLEXIBLE SATELLITE DYNAMICS Final Report [METHODES DE VALIDATION DES MODELES MATHEMATIQUES EN DYNAMIQUE DES SATELLITES NON RIGIDES]
C. A. Darmon Paris ESA 1983 303 p refs In FRENCH
(Contract ESTEC-2991/76/NL-AK(SC))
(ESA-CR-(P)-1794) Avail: NTIS HC A14/MF A01

The linear equations of the dynamics of a rotating or three axis stabilized satellite are analyzed, using a second order Lagrange, a frequential, modal and a variable state model. Satellite sensor equations are solved. It is shown that satellite nonvibration modes are not observed by accelerometers and gyrometers. A fast Fourier transformation nonparametric method which identifies system order is presented. Parameter identification conditions for a second order model are established, and a maximum likelihood estimate algorithm for model parameters is described. An algorithm which identifies modal vectors and frequencies which intervene in the mode model as state variables, and second order model matrices for each observable mode is shown. Author (ESA)

N84-17242# Societe Europeenne de Propulsion, Vernon (France). Dept. Espace.
GEOS 1 AND 2 IN FLIGHT EVALUATION OF THE REACTION CONTROL SYSTEM Final Report
J. Marugan, ed. Paris ESA 7 Jul. 1983 118 p refs
(Contract ESTEC-3640/78/NL-AK)
(SEP-TS/S/194/JM/30301/81(1); ESA-CR(P)-1805) Avail: NTIS HC A06/MF A01

The GEOS 1 and 2 hydrazine thrusters in flight performance was evaluated. The method of calculation of thruster performances, and corresponding accuracies, are presented. Results are compared to ground results from thruster acceptance and qualification tests. Attitude, orbit and spin maneuvers are studied. Thruster behavior is very satisfactory, but is better on GEOS 1 than on GEOS 2, probably due to ground contamination of catalysts. Long nonoperation periods in hard vacuum have no effects on thruster behavior. Overall efficiencies are 90% to 100%. Specific impulses are good (200 to 225 sec in pulsed mode) as confirmed by the 12.5 kg of hydrazine remaining in GEOS 2 tank after 22 months orbit life, while 30.6 kg were loaded for a 24 months expected life. There is no visible influence of aging on thruster performance. Author (ESA)

N84-17243# Madrid Univ. (Spain). Grupo de Trabajo de la Catedra de Mecanica del Vuelo.
STUDY ON OPTIMAL TRACKING STRATEGY Final Report
J. J. Martinez-Garcia, A. Gonzalez-Blazquez, J. Prieto-Villalba, C. Bachmaier, and T. Prieto-Llanos Paris ESA Jun. 1983 180 p refs
(Contract ESA-4730/81/D-JS(SC))
(GMV-211/83; ESA-CR(P)-1807) Avail: NTIS HC A09/MF A01

Theoretical formulations and numerical algorithms developed for optimal satellite tracking are presented. A tracking sequence is selected from a set of possible measurement instants so as to minimize a certain functional of the final error of the observations performed. The final error term of the cost functional is obtained through a Kalman filter algorithm. This approach was used to design a software package, applied to specific test cases for a general second order system and to EXOSAT. The optimal tracking sequence and the accuracy obtained depends on the number of

measurements performed. The tracking data preprocessing task and the tracking pass length requirements were also studied.
Author (ESA)

N84-17279# Consiglio Nazionale delle Ricerche, Frascati (Italy). Ist. Fisica Spazio Interplanetario.
ELECTRODYNAMIC INTERACTIONS BETWEEN A TETHERED SATELLITE SYSTEM AND THE IONOSPHERE
M. Dobrowolny *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 201-206 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N84-17244*# Texas A&M Univ., College Station. Dept. of Aerospace Engineering.
SPACE SHUTTLE ICE SUPPRESSION SYSTEM VALIDATION, VOLUME 1 Final Report
J. L. F. Porteiro, D. J. Norton, and T. C. Pollock 1984 45 p refs 2 Vol.
(Contract NAS9-16443)
(NASA-CR-171740; NAS 1.26:171740; TEES-TR-4587-82-01)
Avail: NTIS HC A03/MF A01 CSCL 22B

Preliminary analytical considerations and the experimental investigation of the flow field for the desired configurations in the absence of wind effects are discussed. A wind tunnel test program to determine the effect of different wind conditions on ice suppression system (ISS) performance is also discussed. Author

N84-17245*# Texas A&M Univ., College Station. Engineering Experiment Station.
SPACE SHUTTLE ICE SUPPRESSION SYSTEM VALIDATION, VOLUME 2
J. L. F. Porteiro, D. J. Norton, and T. C. Pollock [1984] 113 p
(Contract NAS9-16443)
(NASA-CR-171741; NAS 1.26:171741;
TEES-TR-4587-82-01-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 22B

The influence of nozzle size is dramatically illustrated in lab runs. It appears that increasing the size of the nozzle provides better coverage of ogive and mid-region of the external tank. It is interesting to note, however, that for the bottom region of the external tank, coverage seems to decrease with nozzle size. This can be explained if both the assymmetry of the lower set of nozzles and the blockage provided by the Orbiter aft-support structure are taken into account. S.L.

N84-17246*# Texas A&M Univ., College Station. Dept. of Aerospace Engineering.
SPACE SHUTTLE ICE SUPPRESSION SYSTEM VALIDATION, VOLUME 3 Final Report
J. L. F. Porteiro, D. J. Norton, and T. C. Pollock [1983] 171 p
(Contract NAS9-16443)
(NASA-CR-171742; NAS 1.26:171742;
TEES-TR-4587-82-01-Vol-3) Avail: NTIS HC A08/MF A01 CSCL 22B

The influence of nozzle size without wind, on wind penetration, the influence of nozzle pressure on wind penetration, wind velocity effects, nozzle pressure effects, nominal velocity, wind velocity effects on wind penetration, and nozzle azimuth angle effects are plotted. N.W.

N84-17216*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
SHUTTLE ON-ORBIT DYNAMICS
Stanley Fay *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 59-78 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

N84-17221*# Massachusetts Inst. of Tech., Cambridge. Space Systems Lab.
GENERAL REQUIREMENTS FOR SHUTTLE FLIGHT EXPERIMENTS
Edward F. Crawley *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 147-154 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22A

N84-17265*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERACTION OF THE SPACE SHUTTLE ORBITER WITH THE IONOSPHERIC PLASMA
G. B. Murphy, S. D. Shawhan, L. A. Frank, N. DAngelo, D. A. Gurnett, J. M. Grebowsky, D. L. Reasoner, and N. Stone *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 73-78 refs Prepared in cooperation with NASA. Marshall Space Flight Center and Iowa Univ., Iowa City (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N84-17247 Arkansas Univ., Fayetteville.
STUDY OF A PULSE WIDTH MODULATED, TELEMETERED, MICROPROCESSOR BASED DATA ACQUISITION SYSTEM Ph.D. Thesis
Sanjay Wanchoo 1982 120 p
Avail: Univ. Microfilms Order No. DA8322873

A pulse width modulation system was studied in an attempt to enhance its feasibility in a microcomputer based data acquisition system. Pulse width modulation has an advantage analogous to that of frequency modulation, that it is not susceptible to amplitude fluctuations and the signal-to-noise ratio can be increased at the expense of increased bandwidth. However, the most attractive feature of pulse width modulation system was that it could be directly interfaced with the microcomputer. The transmitter was fabricated using an LM 1871 which has the capability of multiplex six channels and operates at 49 MHz. The LM 1871 IC was designed to transmit pulse widths corresponding to resistance values but some system modifications were made to enable it to accept voltage inputs. The voltage encoder for the transmitter was designed for three channels with a range of 0 to 5 volts, whereas the potentiometric application was designed for a range of 0 to 10 kohm. Dissert. Abstr.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N84-17248*# Martin Marietta Aerospace, Denver, Colo.
TECHNOLOGY NEEDS OF ADVANCED EARTH OBSERVATION SPACECRAFT Final Report
James J. Herbert, J. R. Postuchow, and Wilfred A. Schartel

Washington NASA Jan. 1984 261 p
(Contract NAS1-16756)
(NASA-CR-3698; NAS 1.26:3698; MCR-81-630) Avail: NTIS HC A12/MF A01 CSCL 22B

Remote sensing missions were synthesized which could contribute significantly to the understanding of global environmental parameters. Instruments capable of sensing important land and sea parameters are combined with a large antenna designed to passively quantify surface emitted radiation at several wavelengths. A conceptual design for this large deployable antenna was developed. All subsystems required to make the antenna an autonomous spacecraft were conceptually designed. The entire package, including necessary orbit transfer propulsion, is folded to package within the Space Transportation System (STS) cargo bay. After separation, the antenna, its integral feed mast, radiometer receivers, power system, and other instruments are automatically deployed and transferred to the operational orbit. The design resulted in an antenna with a major antenna dimension of 120 meters, weighing 7650 kilograms, and operating at an altitude of 700 kilometers. Author

N84-17249*# Martin Marietta Corp., Denver, Colo.
DEVELOPMENT OF AN AUTONOMOUS VIDEO RENDEZVOUS AND DOCKING SYSTEM, PHASE 3 Final Report
John C. Tietz Jan. 1984 105 p
(Contract NAS8-34679)
(NASA-CR-170969; NAS 1.26:170969; MCR-84-502) Avail: NTIS HC A06/MF A01 CSCL 22B

Field-of-view limitations proved troublesome. Higher resolution was required. Side thrusters were too weak. The strategy logic was improved and the Kalman filter was augmented to estimate target attitude and tumble rate. Two separate filters were used. The new filter estimates target attitude and angular momentum. The Newton-Raphson iteration improves image interpretation.N.W.

N84-17250*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
IN-FLIGHT LOAD TESTING OF ADVANCED SHUTTLE THERMAL PROTECTION SYSTEMS
Bianca M. Trujillo, Robert Meyer, Jr., and Paul M. Sawko Dec. 1983 13 p refs Presented at 2nd AIAA Flight Test Conf., Las Vegas, Nev., 16-18 Nov. 1983 Prepared in cooperation with NASA, Dryden Flight Research Facility
(NASA-TM-86024; H-1212; NAS 1.15:86024; AIAA-83-2704) Avail: NTIS HC A02/MF A01 CSCL 22B

NASA Ames Research Center has conducted in-flight airload testing of some advanced thermal protection systems (TPS) at the Dryden Flight Research Center. The two flexible TPS materials tested, felt reusable surface insulation (FRSI) and advanced flexible reusable surface insulation (AFRSI), are currently certified for use on the Shuttle orbiter. The objectives of the flight tests were to evaluate the performance of FRSI and AFRSI at simulated launch airloads and to provide a data base for future advanced TPS flight tests. Five TPS configurations were evaluated in a flow field which was representative of relatively flat areas without secondary flows. The TPS materials were placed on a fin, the Flight Test fixture (FTF), that is attached to the underside of the fuselage of an F-104 aircraft. This paper describes the test approach and techniques used and presents the results of the advanced TPS flight test. There were no failures noted during post-flight inspections of the TPS materials which were exposed to airloads 40 percent higher than the design launch airloads. Author

N84-17251*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
INVESTIGATION OF ELECTRODYNAMIC STABILIZATION AND CONTROL OF LONG ORBITING TETHERS Final Report, 13 Sep. 1982 - 12 Sep. 1983
Giuseppe Colombo (Padova Univ., Italy) and David Arnold Jan. 1984 159 p refs
(Contract NAS8-35036)
(NASA-CR-170972; NAS 1.26:170972) Avail: NTIS HC A08/MF A01 CSCL 22B

The state-of-the-art in tether modelling among participants in the Tethered Satellite System (TSS) Program, the slack tether and its behavior, and certain advanced applications of the tether to problems in orbital mechanics are identified. The features and applications of the TSS software set are reviewed. Modelling the slack tether analytically with as many as 50 mass points and the application of this new model to a study of the behavior of a broken tether near the Shuttle are described. A reel control algorithm developed by SAO and examples of its use are described, including an example which also demonstrates the use of the tether in transferring a heavy payload from a low-orbiting Shuttle to a high circular orbit. Capture of a low-orbiting payload by a Space Station in high circular orbit is described. Energy transfer within a dumbbell-type spacecraft by cyclical reeling operations or gravitational effects on the natural elasticity of the connecting tether, it is shown, can circularize the orbit of the spacecraft. N.W.

N84-17252*# California Univ., San Diego, La Jolla. Center for Astrophysics and Space Sciences.
ANOMALOUSLY HIGH POTENTIALS OBSERVED ON ISEE Final Technical Report, 15 Sep. 1982 - 30 Sep. 1983
E. C. Whipple, J. S. Krinsky, R. B. Torbert, and R. C. Olsen (Alabama Univ.) Feb. 1984 11 p refs
(Grant NAG3-320)
(NASA-CR-172791; NAS 1.26:172791) Avail: NTIS HC A02/MF A01 CSCL 22B

Data from the two electric field experiments and from the plasma composition experiment on ISEE-1 show that the spacecraft charged to close to -70 V in sunlight at about 0700 UT on March 17, 1978. Data from the electron spectrometer experiment show that there was a potential barrier of some -10 to -20 V about the spacecraft during this event. The potential barrier was effective in turning back emitted photoelectrons to the spacecraft. Potential barriers can be formed because of differential charging on the spacecraft or because of the presence of space charge. The stringent electrostatic cleanliness specifications imposed on ISEE make the presence of differential charging unlikely, if these precautions were effective. Modeling of this event is required to determine if the barrier was produced by the presence of space charge. Author

N84-17253# European Space Agency, Paris (France).
SPACECRAFT/PLASMA INTERACTIONS AND THEIR INFLUENCE ON FIELD AND PARTICLE MEASUREMENTS
A. Pedersen, ed., D. Guyenne, ed., and J. Hunt, ed. Nov. 1983 217 p refs Proc. of 17th ESLAB Symp., Noordwijk, Netherlands, 13-16 Sep. 1983
(ESA-SP-198; ISSN-0379-6566) Avail: NTIS HC A10/MF A01; ESA, Paris FF 140 Member States, AU, CN and NO (+20% others)

The effect of spacecraft-plasma interactions on plasma and electric field measurements was discussed, using results from Voyager, SCATHA, ISEE, and GEOS satellite missions, and space shuttle flights. Spacecraft charging and impact ionization during Halley's comet flyby missions were considered. Means of controlling spacecraft surface potentials were examined. For individual titles, see N84-17254 through N84-17279.

N84-17254# Aerospace Corp., Los Angeles, Calif.
A REVIEW OF SCATHA SATELLITE RESULTS: CHARGING AND DISCHARGING
J. F. Fennell, H. C. Koons, M. S. Leung, and P. F. Mizera *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 3-11 refs (For primary document see N84-17253 08-18)
(Contract AF-F04701-82-C-0083)
Avail: NTIS HC A10/MF A01

Results from the SCATHA satellite charging monitors and discharge detectors are summarized. The data show that surface charging, near synchronous altitudes, occurs preferentially in the midnight to local morning sectors. Evidence for bulk charging by energetic electrons is also observed. Material charging data show that there is a marked increase in bulk conductivity of solar-

illuminated Kapton with exposure time in the space vacuum. Teflon accumulates a permanent charge which slowly increases with time. A quartz cloth material charges to higher than expected levels. Statistical analysis of the surface charging and the resultant discharges and noise generation shows a close association with each other. Discharges are ascribed to possible bulk charging. The signal amplitudes of the discharges are discussed and the temporal character of the discharge signal is shown. Author (ESA)

N84-17255*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. Lab. for Extraterrestrial Physics.

PROBE MEASUREMENT OF DC ELECTRIC FIELDS

T. L. Aggson, B. G. Ledley, A. Egeland (Oslo Univ.), and I. Katz (Systems, Science and Software Corp.) *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 13-17 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Measurements made with the 100 m electric field antenna on the SCATHA satellite were used to derive the dipole electrostatic potential in the satellite sheath. The measurements indicate a sheath field dominated by the satellite's surface charge near the satellite, and by photoelectrons at larger distances. These observations were made during the antenna deployment at L values between 5 and 6 over several days. To model these observations at large distances from the satellite the Debye equation is expanded into a multipolar series as a function of the radial distance divided by the Debye length. Closer to the satellite's surface, the NASCAP spacecraft charging program was modified to calculate the charge and potential in the satellite's sheath with an iterative, self-consistent routine. Results indicate that the electric field component in the sunward direction can change signs at a distance from the satellite surface comparable to satellite dimensions. This agrees with observed data. Author (ESA)

N84-17256# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.

OBSERVATIONS OF THE GEOS-2 EQUILIBRIUM POTENTIAL AND ITS RELATION TO THE AMBIENT ELECTRON ENERGY DISTRIBUTION

K. Knott, A. Korth (Max-Planck Inst. fuer Aeronomie, Katlenburg-Landau, West Germany), P. Decreau (CNRS, Orleans, France), A. Pedersen, and G. Wrenn (Mullard Space Science Lab., Surrey, England) *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 19-24 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

A method to measure the equilibrium potential of a spacecraft with conductive outer surfaces is described. The method was used to monitor the equilibrium potential of the GEOS 2 spacecraft over 4 years. Results show that the equilibrium potential of GEOS in sunlight is always moderately positive and only rarely exceeds +10 V with respect to ambient space. At no instance in the sunlit portion of the orbit does the spacecraft assume a negative potential. The observed moderate positive equilibrium potential is generally a function of cold plasma density. During the night and early morning part of the orbit, however, periods where the high energy particle population dictates the equilibrium potential occur. Author (ESA)

N84-17257# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics.

THE POTENTIAL OF ISEE IN DIFFERENT PLASMA ENVIRONMENTS

P.-A. Lindqvist *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 25-33 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

Data from ISEE satellite experiments are used to show that a photoemitting electric field probe can be held at or near the plasma potential with a bias current which compensates for the photoelectron loss. The potential of the photoemitting satellite body may then be measured with reference to this probe. The satellite assumes a floating potential such that the ambient plasma thermal electron current and the photoelectron current balance. This floating satellite potential is shown to be proportional to the logarithm of the electron flux. Satellite potential is measured instantaneously, and thus very rapid variations in plasma density and temperature may be studied by observing this potential. The behavior of the ISEE-1 satellite potential in different plasma regions of the magnetosphere and the solar wind is summarized. Potential ranges from a few volts in the dense plasmasphere or magnetosheath to 50 V in the tenuous tail lobes. Author (ESA)

N84-17258*# California Univ., La Jolla. Center for Astrophysics and Space Sciences.

ANOMALOUSLY HIGH POTENTIALS OBSERVED ON ISEE

E. C. Whipple, I. S. Krinsky, R. B. Torbert, and R. C. Olsen (Alabama Univ., Huntsville) *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 35-40 refs (For primary document see N84-17253 08-18)
(Grant NAG3-20)
Avail: NTIS HC A10/MF A01 CSCL 22B

Data from two electric field experiments and from the plasma composition experiment on ISEE-1 are used to show that the spacecraft charged to close to -70 V in sunlight at 0700 UT on March 17, 1978. Data from the electron spectrometer experiment show that there was a potential barrier of -10 to -20 V about the spacecraft during this event. The potential barrier was effective in turning back emitted photoelectrons to the spacecraft. The stringent electrostatic cleanliness specifications imposed on ISEE make the presence of differential charging unlikely. Modeling of this event is required to determine if the barrier was produced by the presence of space charge. Author (ESA)

N84-17259# Observatoire de Meudon (France).

ANOMALOUS BEHAVIOR OF ISEE-1 DETECTED BY THE ELECTRON DENSITY EXPERIMENT

C. C. Harvey *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 41-46 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

In-flight calibration of the ISEE propagation electron density experiment (electron density measured by a radio wave propagation technique) identified two anomalous events, near perigees 661 and 726 respectively. Both events were accompanied by anomalous observations from electric field experiments, suggesting that plasma sheath effects may be involved. Spacecraft malfunction could also be responsible, but no clear explanation of the anomalies is available. Author (ESA)

N84-17260*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics and Center for Space Research.

CHARGING EFFECTS OBSERVED ON VOYAGER 1 NEAR JUPITER

A. Barnett and R. L. McNutt *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 47-50 refs (For primary document see N84-17253 08-18)
(Contract JPL-953733)
Avail: NTIS HC A10/MF A01 CSCL 22B

Data from the Voyager 1 Plasma Science Experiment instrument's high resolution mode, which measures ions in the energy per charge range of 10 to 5950 V with 3.5% resolution are discussed. The plasma at Jupiter consists of several ionic species streaming with the same bulk velocity. The spacecraft potential can be inferred from the relative positions of the peaks in the spectra due to the ionic species. In the cold Io plasma torus, the spacecraft potential is slightly negative, while the middle magnetosphere is slightly positive. There is no evidence that the magnitude of the spacecraft potential ever exceeds 50 V, although it is not possible to determine spacecraft potential from spectra which lack resolved peaks, such as those from the warm torus and other regions where the plasma thermal speed was comparable to the bulk speed. Author (ESA)

N84-17261# Max-Planck-Institut fuer Extraterrestrische Physik, Garching (West Germany).
INFLUENCE OF WAKE AND PHOTOEMISSION ON ELECTRIC FIELD MEASUREMENTS WITH A DOUBLE PROBE ON GEOS-2
O. H. Bauer, R. Grard (ESTEC, Noordwijk, Netherlands), G. Haerendel, and A. Pedersen (ESTEC, Noordwijk, Netherlands) *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 51-56 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

Plasma conditions under which reliable corrections may be applied to GEOS 2 double probe measurements in order to remove the contribution of the spurious fields generated by the interactions of the system with its environment are investigated by comparing double probe data with electron gun data. When the discrepancies between the two data sets can be understood qualitatively, an intercalibration can be applied to give a direct measure of the fields associated with wake and photoemission effects, and yield empirical corrective terms which can be substracted from the double probe measurements. Author (ESA)

N84-17262*# Alabama Univ., Huntsville.
COMPARISON OF THERMAL PLASMA OBSERVATIONS ON SCATHA AND GEOS
R. C. Olsen, J. F. E. Johnson (Southampton Univ., England), P. Decreau (CNRS, Orleans, France), G. Wrenn (Univ. Coll., London), A. Pedersen (ESTEC, Noordwijk, Netherlands), and K. Knott *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 57-61 refs (For primary document see N84-17253 08-18)
(Contracts NAS8-35339; NAS8-33982; Grant NsG-3150; Contract F04701-77-C-0062)
Avail: NTIS HC A10/MF A01 CSCL 22B

The SCATHA and GEOS 2 observations are compared in order to determine the relationship between the hidden ion population measured by SCATHA, and the missing density component of the GEOS particles detectors. Analysis shows that the wave instruments on GEOS measure the cold plasma population which is only visible to the SCATHA/UCSD detector in eclipse. Given a -28 V bias, the GEOS suprathermal plasma analyzers can also measure this plasma, at the cost of little or no energy resolution on the cold plasma. It is not clear if the missing component of the plasma found at apogee on GEOS-1 is identified.
Author (ESA)

N84-17263# Southampton Univ. (England).
ION MEASUREMENTS ON GEOS USING A NEGATIVELY BIASED SENSOR ON A POSITIVELY CHARGED SPACECRAFT
J. F. E. Johnson and G. Wrenn (Mullard Space Science Lab., Surrey, England) *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 63-68 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

The process by which spacecraft become charged in sunlight in a magnetospheric plasma is summarized, and the technical requirements for spacecraft and instruments for low energy plasma measurement are outlined. These precautions were adopted for the GEOS spacecraft and the Suprathermal Plasma Analyzer (SPA). The SPA measures plasma densities down to 0.1/cu cm and temperatures from < 0.3 to many tens of eV. Spacecraft potentials in the range -2V to over +16V are normally observed in sunlight. Effects of the photoelectron sheath on the low energy ion measurements can be seen in low density ion data. Author (ESA)

N84-17264# Consiglio Nazionale delle Ricerche, Frascati (Italy). Ist. di Fisica dello Spazio Interplanetario.
THE DC ELECTRIC FIELD IN SPACE: DIRECT MEASUREMENTS AND INFERENCES FROM COLD PLASMA DRIFTS
S. Orsini, E. Amata, M. Candidi, M. Stokholm (Bern Univ.), A. Pedersen (ESTEC, Noordwijk, Netherlands), and P. A. Lindqvist (Royal Inst. of Tech.) *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 69-72 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

Data from the GEOS-2 and ISEE satellites are used to compare electric fields directly measured on board satellites with those inferred from drift properties of ambient plasma. It is found that a satisfactory agreement exists. Author (ESA)

N84-17265*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERACTION OF THE SPACE SHUTTLE ORBITER WITH THE IONOSPHERIC PLASMA c16
G. B. Murphy, S. D. Shawhan, L. A. Frank, N. DAngelo, D. A. Gurnett, J. M. Grebowsky, D. L. Reasoner, and N. Stone *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 73-78 refs Prepared in cooperation with NASA. Marshall Space Flight Center and Iowa Univ., Iowa City (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

The effects of large spacecraft on ionospheric plasma was studied using STS 3 Plasma Diagnostics Package, Vehicle Charging and Potential Experiment, and subsequent STS flight data. Environment modification by contamination such as Orbiter outgassing, thruster operation and water dumps results in altered neutral pressure, modified plasma density and an altered chemical composition. The physical size and velocity of the Orbiter vehicle produces a plasma wake, generates electric fields, results in surface effects and generates broadband electrostatic noise. Author (ESA)

N84-17266*# Parker (Lee W.), Inc., Concord, Mass.
CONTRIBUTIONS TO SATELLITE SHEATH AND WAKE MODELING
Lee W. Parker *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 81-100 refs Sponsored by NASA and AF (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Approaches to charge density and surface current calculations in numerical modeling of satellite plasma sheaths and wakes are reviewed. A modeling approach and sample solutions for 3 dimensional high voltage sheaths and the effects of dielectrics and plasma flow are presented. Results obtained on wake structures and differential charging of small bodies are summarized. Wake structures and differential charging of large bodies are discussed. Author (ESA)

N84-17267# York Univ., Toronto (Ontario). Dept. of Physics.
INCIDENT VELOCITY DISTRIBUTIONS ON SAMPLING ELECTRODES OF SPACECRAFT PLASMA INSTRUMENTS
J. G. Laframboise *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 101-108 refs (For primary document see N84-17253 08-18)
(Grant A-4638)
Avail: NTIS HC A10/MF A01

Numerically-computed velocity-space cutoff boundaries for incident particles applicable to the sampling conditions of low-energy charged-particle detectors (including electrostatic energy analyzers and flush disk probes) located on the surfaces of spacecraft or sounding rockets are presented. They are obtained from the results of self-consistent sheath potential calculations for spherical electrodes in collisionless, Maxwellian plasmas. Results are applied to the calculation of current-voltage characteristics of retarding-potential analyzers. Analysis shows that the planar-sheath approximation does not provide the correct result in the limit of small Debye length, because of a quasineutral presheath outside the electrode. The sheath potential can influence the velocity-space cutoff boundaries at particle energies up to many times the thermal energy of the surrounding plasma. Author (ESA)

N84-17268*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NASCAP SIMULATIONS OF SPACECRAFT CHARGING OF THE SCATHA SATELLITE
I. Katz (Systems, Science and Software), P. R. Stannard (Systems, Science and Software), L. Gedeon, J. C. Roche, A. G. Rubin

(AFGL), and M. F. Tautz (AFGL) *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 109-114 refs (For primary document see N84-17253 08-18)
(Contract NAS3-22536)
Avail: NTIS HC A10/MF A01 CSCL 22B

Data collected by the SCATHA spacecraft were used with NASCAP to simulate the charging response of the spacecraft ground conductor and dielectric surfaces. Spacecraft charging in eclipse, during moderate and severe substorms, and in sunlight was reproduced using the code. Close agreement between measured currents and potentials and the NASCAP simulated response is obtained for differential charging. Results reveal a strong correlation between the collection of particles with energies below 50 keV and the degree of charging. Author (ESA)

N84-17269*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE ROLE OF POTENTIAL BARRIER FORMATION IN SPACECRAFT CHARGING
C. K. Purvis *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 115-124 refs Previously announced as N83-35005 (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

The role of potential barrier formation in spacecraft charging at geosynchronous orbit is discussed. Sudden dramatic shifts in structure potential at eclipse entry and exit, and in response to injections of hot plasma during eclipse do not indicate the magnitude of differential charging. All daylight charging and some long-term eclipse charging is barrier dominated. Shaded or low yield surfaces charge negatively, forming vacuum potential barriers which suppress emission of photoelectrons and secondary electrons, causing the spacecraft to charge negatively. This process, which is configuration and material dependent, limits the magnitude of insulator-negative differential charging to values substantially lower than supposed, and allows the possibility of insulator-positive differential charging. Discharges are less energetic and more localized than supposed. If the spacecraft changes its potential when electrons are emitted in a discharge, then when the structure is driven positive, electron emission should cease. Author (ESA)

N84-17270*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IMPACT IONIZATION EFFECTS ON PIONEER VENUS ORBITER
E. C. Whipple (California Univ., San Diego, La Jolla), L. H. Brace, and L. W. Parker (Parker (Lee W.) Inc.) *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 127-132 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Anomalies observed during periapsis passages of the Pioneer Venus Orbiter are discussed. Data from the Langmuir Probe Experiment show a change in the collected current at periapsis which correlates well with the neutral atmospheric density. The data can be qualitatively explained by the secondary emission of electrons from the spacecraft and from the probe caused by the impact of neutral CO2 molecules, the dominant neutral constituent at periapsis altitude of 150 km. Impact energy is 22 eV. The probe showing this effect is mounted on the leading surface of the spacecraft which is exposed to the streaming neutral gas. As the probe voltage is swept, contributions to the current from the ionospheric plasma and from the secondary electrons can be distinguished. The observed current/voltage behavior suggests a probe-barrier interaction. Author (ESA)

N84-17271# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
LABORATORY MEASUREMENT OF IMPACT IONIZATION
H. Arends and R. Schmidt *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 133-141 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

Neutral gas impact effects on spacecraft passing through the coma of Halley's comet were simulated in a vacuum chamber. Gas bombardment was simulated by an ion source producing a neutral particle beam of argon or xenon. The energy of the particles varied between 1 and 3 keV; flux is on the order of 10 to the 16th power/sqm/sec. The behavior of aluminum and gold under bombardment by these particles was studied and secondary emission fluxes of ions and electrons as well as the resulting charging potential of the target were determined. Author (ESA)

N84-17272# Los Alamos Scientific Lab., N. Mex. Space Plasma Physics.
ENERGY DISTRIBUTIONS AND YIELDS OF SECONDARY IONS AND ELECTRONS EMITTED BY GIOTTO DURING HALLEY ENCOUNTER
D. T. Young *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 143-150 refs Sponsored by DOE (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

Data on the energy distributions and yields of secondary electrons and ions relevant to the problems of GIOTTO spacecraft charging are summarized. It is pointed out that the threshold velocity for kinetic emission of secondary electrons by neutral gas is very nearly equal to the GIOTTO ram velocity. This makes it difficult to predict electron yields due to neutral gas impact. Author (ESA)

N84-17273# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
SHOT NOISE GENERATED BY GAS IMPACT DURING A COMETARY FLY-BY **c91**
Rejean Grard *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 151-159 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

The spectrum of shot noise detected by a satellite electric field sensor made of two spheres in the solar wind and at various distances from the nucleus of comet Halley is predicted. The interaction between the antenna and the cometary gas flow is analyzed. At low frequencies, the noise is dominated by the effect of escaping or collected particles, and the distribution varies. At intermediate frequencies, the role of the trapped particles is preponderant, and the spectrum is flat. At high frequencies, above the inverse bounce period, the noise spectrum decreases. The noise level can be reduced by using meshed probes which have a smaller collecting area. This approach is particularly efficient at frequencies > 1 kHz for spheres 5 cm in radius; the antenna impedance is then mostly capacitive and a reduction of its conductance has no significant effect. Author (ESA)

N84-17274# Parker (Lee W.), Inc., Concord, Mass.
A MODEL OF ELECTROSTATIC CHARGING AND SHEATH STRUCTURE OF GIOTTO NEAR HALLEY'S COMET **c91**
Lee W. Parker *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 161-166 refs Sponsored by ESA (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

The GIOTTO spacecraft potential and sheath structure were predicted. The contributions of ambient plasma, and the effects due to higher fluxes expected upon closer approach to the nucleus are discussed. The spacecraft potential is less positive in the presence of ambient plasma. The positive potential barrier adjacent to the center of the bumper shield is high enough to return most of the ions emitted from the central portion of the shield to the surface. The height of this potential barrier relative to the spacecraft increases proportionally to the square root of the flux and is insensitive to the absolute potential of the spacecraft (so that 500 V barriers can occur when the flux increases by 1000). Ions escape from the edge region of the shield rather than

from the center. The possibility of multiple steady states is discussed. Author (ESA)

N84-17275# Air Force Geophysics Lab., Hanscom AFB, Mass.
THE CONCEPTS OF CRITICAL TEMPERATURE AND ENERGY CUTOFF OF AMBIENT ELECTRONS IN HIGH VOLTAGE SPACECRAFT CHARGING OF SPACECRAFT
S. T. Lai, M. S. Gussenhoven (Boston Coll.), and H. A. Cohen *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 169-175 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

The concepts of critical temperature and critical energy cutoff of ambient Maxwellian electrons in high voltage spacecraft charging are elucidated. These are shown to be connected and to determine the necessary conditions for negative charging of a spacecraft. The critical curves delineating the charging and no-charging domains in electron temperature and upper energy cutoff were calculated for a number of materials. The significance of the concepts developed in the monitoring of space environments for the prediction of spacecraft charging is stressed. Observations of critical energies and theoretical predictions of temperature dependence of spacecraft charging are unified and explained. Author (ESA)

N84-17276*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A POTENTIAL CONTROL METHOD FOR THERMAL PLASMA MEASUREMENTS ON THE DE-1 SPACECRAFT
R. C. Olsen (Alabama Univ., Huntsville), D. L. Gallagher (Alabama Univ., Huntsville), S. D. Shawhan (Iowa Univ., Iowa City), C. R. Chappell, and J. L. Green *In* ESA Spacecraft/Plasma Interactions and their influence on Field and Particle Meas. Nov. 1983 p 177-184 refs (For primary document see N84-17253 08-18)
(Contracts NAS8-33982; NAS5-25690; Grant NSF ATM-8-300426)
Avail: NTIS HC A10/MF A01 CSCL 22B

Thermal plasma measurements form the Dynamics Explorer 1 spacecraft using an aperture bias in the outer plasmasphere and over the polar cap are used to show the existence of cold plasma, otherwise hidden from the particle detector by spacecraft potentials between 1 and 3 V. In eclipse, the photoelectron current drops and the spacecraft potential drops to near 0 V. At density levels between 10 and 100/cu cm, the cold plasma becomes visible in eclipse, along with a warmer tail to the distribution. Electrostatic models of the spacecraft indicate that if the spacecraft potential is more than a few volts positive, an electrostatic barrier can inhibit the effectiveness of aperture bias. Comparison of the aperture bias experiments with the electrostatic models show that the aperture bias is successful in drawing in the field-aligned flows, with kinetic energy greater than the predicted barrier height, but may not be sufficient to measure the isotropic background. Author (ESA)

N84-17277*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
METHODS FOR KEEPING A CONDUCTIVE SPACECRAFT NEAR THE PLASMA POTENTIAL
A. Pedersen (ESTEC, Noordwijk, Netherlands), C. R. Chapell, K. Knott, and R. C. Olsen *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 185-190 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01 CSCL 22B

Methods for spacecraft potential control when carrying out low energy plasma measurements are described. Method 1, the most effective, uses a hollow cathode Xe plasma emitter which makes positive and negative control possible relative to the plasma in sunlight as well as eclipse. Method 2 uses a high energy ion emitter to limit large positive potentials in sunlight. Method 3 uses a cathode to emit electrons under eclipse conditions. The method of biasing a spacecraft relative to a large body is difficult to implement. Author (ESA)

N84-17278# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
ACTIVE CONTROL OF THE POTENTIAL OF ISEE-1 BY AN ELECTRON GUN
Jean-Pierre Lebreton *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 191-197 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

A method for actively controlling the floating potential of the ISEE-1 spacecraft which in sunlight floats at a few volts positive with respect to the ambient space potential, is described. An electron gun increases satellite floating potential up to a value close to the beam accelerating voltage, provided the beam current is above a threshold which depends on ambient plasma density. The method is affected by the complicated configuration of the spacecraft, on which long booms can be polarized at different potential with respect to the ambient space potential. Photoemission, polarization of the long booms and the operation of the two electron guns are discussed. It is shown that data obtained during gun operation can be used to determine the plasma density and temperature. Author (ESA)

N84-17279# Consiglio Nazionale delle Ricerche, Frascati (Italy). Ist. Fisica Spazio Interplanetario.
ELECTRODYNAMIC INTERACTIONS BETWEEN A TETHERED SATELLITE SYSTEM AND THE IONOSPHERE c15
M. Dobrowolny *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 201-206 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

The status of knowledge concerning electrodynamic interactions of long metallic tethers with the ionosphere is reviewed. Work on charged particle collection is recalled as well as ideas concerning a more global interaction of the system with the ionosphere. The priority goals of an electrodynamic tether mission are outlined. Author (ESA)

N84-17280# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE QUESTION OF OPTIMIZATION OF THREE-DIMENSIONAL MANEUVER OF ORBITAL APPARATUS IN THE ATMOSPHERE
V. T. Pashintsev 20 Oct. 1983 38 p Transl. into ENGLISH from Tr. Tsentralnogo Aero-Gidrodinamicheskogo Inst. (USSR), no. 1243, 1970 p 1-15
(AD-A134753; AD-E000550; FTD-ID(RS)T-0874-83) Avail: NTIS HC A03/MF A01 CSCL 22/3

The aerodynamic rotation of the plane of the motion of a flight vehicle, which occurs during deorbiting of the ISZ satellite into the dense layers of atmosphere, with its subsequent escape to assigned flight altitude above certain fixed points of the Earth's surface were examined. The simple methods of construction of the approximate program of control by roll altitude, that makes it possible to satisfy limitations to finite values of phase coordinates is indicated. GRA

N84-17281# Air Force Geophysics Lab., Hanscom AFB, Mass.
PROCEEDINGS OF THE AIR FORCE GEOPHYSICS LABORATORY WORKSHOP ON NATURAL CHARGING OF LARGE SPACE STRUCTURES IN NEAR EARTH POLAR ORBIT
R. C. Sagalyn, D. E. Donatelli, and I. Michael 25 Jan. 1983 406 p Workshop held at Hanscom AFB, Mass., 14-15 Sept. 1982
(AF Proj. 7661)
(AD-A134894; AFGL-TR-83-0046; AFGL-ERP-825) Avail: NTIS HC A18/MF A01 CSCL 05/2

A workshop on Natural Charging of Large Space Structures in Near Earth Polar Orbits, sponsored by the Air Force Geophysics Laboratory and Boston College, was held on 14 and 15 September, 1982, at AFGL. Many of the specialists in the area of spacecraft charging problems assembled to discuss the necessity and/or possibility of developing realistic, effective codes describing the interaction of low Earth orbiting systems with the environment. The workshop consisted of four sessions: (1) tutorial lectures on

the characteristics of the near-Earth environment and its effects on large space structures; (2) experiments examining and interpreting spacecraft charging and the environment causing it; (3) theoretical interpretation of spacecraft charging and the environment in which it occurs; (4) modeling space structures in a charging environment. GRA

N84-17282# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.
ORBITAL PROPULSION MODULE SYSTEM CONFIGURATION STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report
H. P. Nguyen, R. Rault, B. Brocail, P. Villefranche, J. P. Bard, Mangot, B. Allagnon, M. Patin, and J. C. Realland Paris ESA 28 Jun. 1983 70 p refs 2 Vol.
(Contract ESA-5154/82/NL-PP)
(S/DT/YA-25-030-Vol-1; ESA-CR(P)-1790-Vol-1) Avail: NTIS HC A04/MF A01

Liquid propulsion systems for orbital transfer of satellites were studied. A self-standing stage with all necessary housekeeping functions; modular assembly; and integrated propulsion were considered. Because the stage and the module lead to the same structural mass, advantages of these two configurations can be combined to give a stage from which elements can be removed (structural elements and propellant tanks to fit the mission need; electrical elements as far as the satellite uses its own functions). This stage with removable elements requires more complicated cabling than in traditional vehicles, but this does not cause feasibility problems, and in the worst case a mass penalty of < 10 kg results. Author (ESA)

N84-17283# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.
ORBITAL PROPULSION MODULE SYSTEM CONFIGURATION STUDY, VOLUME 2 Final Report
Regis Rault Paris ESA 28 Jun. 1983 368 p refs In FRENCH; ENGLISH summary 2 Vol.
(Contract ESA-5154/82/NL-PP)
(S/DT/YA-25-030-Vol-2; ESA-CR(P)-1790-Vol-2) Avail: NTIS HC A16/MF A01

Scenarios of payload delivery by STS and by Ariane launch vehicle were examined to determine possible missions using orbital propulsion modules. Propulsion system options and requirements were studied for low Earth, geosynchronous, high eccentric, and escape orbits. Criteria are established for the selection of mission types and the choice of three missions is justified. Results of technical and architectural studies of 9 combinations (3 options, 3 missions) of the orbital propulsion module are presented. It is shown that the module selected should provide better performance than the other possible options and that the stage selected offers easy to design interfaces that are compatible with Ariane 4 and 5 and with the STS. An economic analysis methodology is described which can indicate which option to choose for each mission. Transl. by A.R.H.

N84-17284# Contraves Corp., Zurich (Switzerland).
STUDY ON LARGE, ULTRALIGHT LONG-LIFE STRUCTURES IN SPACE, PHASE 2C Final Report
M. C. Bernasconi Paris ESA 2 Jul. 1983 84 p refs
(Contract ESTEC-5156/82/NL-PB(SC))
(TM-EKR3; ESA-CR(P)-1796) Avail: NTIS HC A05/MF A01

A design of an inflatable, space rigidized structure (ISRS) offset antenna reflector, its manufacturing approach, and the development of a light weight, inflatable stabilization torus to be used for this design are described. A structural concept for a 12 m aperture offset reflector was defined. A continuous fabrication method for the stabilization torus was identified. Instruments for the torus design which relate the mass added by the torus complex and the pressure level, necessary for stabilization purposes were prepared. Tests with an unreinforced simulacrum of the inflatable reflector, which validate the proposed pressure prediction formulas, were performed. A development plan, leading to a ground demonstration of the ISRS technology for large expandable structures is presented. Author (ESA)

N84-17285# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
STUDY OF ATTITUDE CONTROL AND GUIDANCE SYSTEM (ACGS) FOR ORBIT CHANGE STAGE
W. Craemer, B. Lange, B. Moeckl, W. Schrempp, C. Seelhorst, and D. Valentian (Societe Europeenne de Propulsion, Vernon, France) Paris ESA 28 Feb. 1983 263 p refs
(Contract ESTEC-4884/81/NL-AK(SC))
(ESA-CR(P)-1797) Avail: NTIS HC A12/MF A01

Missions and orbit change stage configurations considered as design drivers for the ACGS are presented. The general design requirements are derived and a model mission, transfer from low Earth orbit into geostationary orbit, is investigated. The control concept of the ACGS, the theoretical formulation of the attitude control algorithms, and the mathematical models used in system simulation are presented. Simulation results showing system performance and stability are summarized. Available hardware and production possibilities of the control electronics are reviewed. System parameters and the test philosophy are outlined. Author (ESA)

N84-17286# General Accounting Office, Washington, D. C. National Security and International Affairs Div.
IMPLICATIONS OF JOINT NASA/DOD PARTICIPATION IN SPACE SHUTTLE OPERATIONS
7 Nov. 1983 57 p
(PB84-122472; GAO/NSIAD-84-13; B-205335) Avail: NTIS HC A04/MF A01 CSCL 22B

The space shuttle's emergence as the single launch system for all U.S. spacecraft, civilian and military, has required increased NASA participation in military space operations. Separate civilian and military space programs have been the topic of substantial debate within NASA, DOD, and the Congress in recent years. The debate has focused on the economies of a joint NASA/DOD space program and the effect that joining the civilian and military space programs will have on the missions of each agency. Advocates of increased cooperation between NASA and DOD argue that this arrangement is economical and efficient. Opponents object to mixing different agency missions and objectives. The report discusses issues related to joint NASA/DOD space activities and makes recommendations to address these issues. GRA

N84-17218*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DEPLOYABLE BEAM FLIGHT EXPERIMENT (MAST)
Brantley R. Hanks and John L. Allen, Jr. *In its* STEP Expt. Requirements Jan. 1984 p 103-120 ref (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

N84-17219*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ERECTABLE BEAM EXPERIMENT
Walter L. Heard, Jr. *In its* STEP Expt. Requirements Jan. 1984 p 121-134 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

N84-17220*# Astro Research Corp., Carpinteria, Calif.
THE STEP/STACBEAM EXPERIMENT TECHNOLOGY DEVELOPMENT FOR VERY LARGE SOLAR ARRAY DEPLOYERS
Ron Samuels *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 135-146 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

N84-17229*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INTEGRATED POWER/ATTITUDE CONTROL SYSTEM (IPACS) TECHNOLOGY EXPERIMENT
Claude R. Keckler *In its* STEP Expt. Requirements Jan. 1984 p 231-240 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

N84-17232*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE DEPLOYABLE ANTENNA FLIGHT EXPERIMENT FOR THE SPACE TECHNOLOGY EXPERIMENTS PLATFORM (STEP)
B. C. Tankersly (Harris Corp.) and Thomas G. Campbell *In its* STEP Expt. Requirements Jan. 1984 p 279-300 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

N84-17233*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE 55-METER-STRUCTURE FLIGHT EXPERIMENT
John A. Garba, Robert Freeland, Ben K. Wada, Kirk J. OKeefe (Lockheed Missile and Space Co., Sunnyvale, Calif.), and Art Woods (Lockheed Missile and Space Co., Sunnyvale, Calif.) *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 301-310 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

N84-17234*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE INFLATED-ANTENNA SYSTEM
W. F. Hinson and L. S. Keafer *In its* STEP Expt. Requirements Jan. 1984 p 311-324 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 22B

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N84-17287*# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
SSME STRUCTURAL DYNAMIC MODEL DEVELOPMENT Final Report
M. J. Foley, D. M. Tilley, and C. T. Welch Dec. 1983 281 p refs
(Contract NAS8-34973)
(NASA-CR-170960; NAS 1.26:170960; LMSC-HREC-TR-D867307) Avail: NTIS HC A13/MF A01 CSCL 21H

A mathematical model of the Space Shuttle Main Engine (SSME) as a complete assembly, with detailed emphasis on LOX and High Fuel Turbopumps is developed. The advantages of both complete engine dynamics, and high fidelity modeling are incorporated. Development of this model, some results, and projected applications are discussed. Author

N84-17288# Sverdrup Technology, Inc., Arnold Air Force Station, Tenn.
INERTIAL UPPER STAGE (IUS) SOLID ROCKET MOTOR (SRM) CORE FLOW SAMPLING AT HIGH ALTITUDES Final Report, 1979 - 1982
P. T. Girata, Jr., W. K. McGregor, and R. Quinn AEDC Nov. 1983 38 p
(AD-A134997; AEDC-TR-83-1) Avail: NTIS HC A03/MF A01 CSCL 21/2

Plume core flow samples which could be analyzed for both gaseous and particle content were obtained during the firing of Inertial Upper Stage (IUS) motors DS4A (Feb. 13, 1981) and DS8C (July 30, 1981) in the AEDC Test Cell J-5 at a simulated altitude of 120 Kft. During the DS4A test, samples were obtained with a tungsten-tipped probe located 10 in. off centerline and 87 in. downstream of the nozzle exit. Three samples were obtained at 1.5, 13.5, and 23.8 sec into the firing. Results of the sampling were generally satisfactory, and the probe held up during the sampling period. Analysis of the gas samples gave expected species concentrations. Analysis of the solid material collected revealed that the rocket produced exclusively aluminum oxide with most of the particles less than 2 microns in diameter. Three tungsten-tipped probes were used during the DS8C motor firing. Two probes were located 87 in. downstream, one at the centerline (using water ingestion, 60 g of particles were obtained). The third probe was located 57 in. downstream on the nozzle exit angle. The DS8C analysis compares very well with the DS4A data. GRA

N84-17289# Phrasor Scientific, Inc., Duarte, Calif.
ION SOURCE FOR A ROCKET PAYLOAD Final Quarterly Status Report, Sep. 1980 - Sep. 1982
J. Perel Aug. 1983 34 p
(Contract F19628-80-C-0201; AF Proj. 7601)
(AD-A135051; AFGL-TR-83-0233; FQSR-6) Avail: NTIS HC A03/MF A01 CSCL 04/1

This report covers the design, development, testing and delivery of ion source and electron gun systems as part of a sounding rocket payload. A Prototype Model was delivered for laboratory test mapping and compatibility with power supplies. A Flight Model was also delivered which is scheduled to be part of a sounding rocket payload. The Flight Model is designed to eject ions and electrons into the upper atmosphere according to a specified schedule. The basic ion source is the Capillaritron which can produce ions using any gas. It is composed of a very fine capillary nozzle from which gas is emitted when high voltage is applied. The source produces a small luminous plume from which ion and fast neutrals are ejected into a beam. It requires neither a cathode nor any preparations to turn on or off. Both the delivered Prototype Model and the Flight Model contain nine (9) capillary nozzles, each able to produce from less than one microamp to over one milliamp of beam current. The electron gun is composed of a 10 mil Ta wire about 2.5 cm long and is capable of emitting over 10 milliamps when heated by about 16 watts. Both the ion source and the electron gun are capable of operating from about one microamp to ten milliamps independently of each other. Specifications, operational data and photographs of these models are included in this report. Author (GRA)

N84-17290# Societe d'Etudes et de Services pour Soufflerles et Installations Aerothermodynamiques, Paris (France).
INVESTIGATION OF FREE JETS ISSUED FROM SMALL SOLID PROPELLANT ROCKET ENGINES
J. Allegre, M. Raffin, and J.-C. Lengrand (CNRS, Meudon, France) 1983 20 p refs Presented at Intern. Congr. on Instrumentation in Aerospace Facilities, St. Louis, France, 20-24 Sep. 1983
Avail: NTIS HC A02/MF A01

Pitot probe and electron beam measurements were performed in the plumes exhausting from small solid propellant rocket engines into a low density atmosphere. Results indicate freezing of the vibrational energy and consistency of the data with a jet model. Two parameters introduced in the interpretation of electron beam data were adjusted, but their final values do not differ greatly from predictions based on their physical meaning. Results confirm the usefullenss of electron beam fluorescence techniques for studying rocket exhausts. Author (ESA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

No abstracts in this category.

24 COMPOSITE MATERIALS

Includes laminates.

N84-17291# Overseas Relations Branch Translation Service, London (England).
VACUUM IONIC CARBURISATION
L. M. Han and G. J. Ma 28 Nov. 1983 21 p refs Transl. into ENGLISH from Heat Treatment (China), no. 4, 1981 p 15-22
(BLL-OA-Trans-3149-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

The components to be carburized are heated under low pressure and a small amount of carburizing gas is introduced into the furnace at the required temperature. The carburization gas was ionized by applying several hundred volts (DC) between cathode (component) and anode, to produce a glow discharge and thus bring about carburization. Vacuum ion carburization offers a series of advantages relating to carburization itself as well as to heat treatment by ion bombardment, including giving products of good quality, a short treatment time, ready control of technical data, energy saving, and no environmental pollution. Obvious advantages are found compared with other methods of carburization, when components of complicated shape with deep and thin holes or narrow grooves, etc. are to be treated. The technique and equipment are still at the development stage at present and require further improvement. Author

N84-17292*# North Carolina State Univ., Raleigh.
EFFECTS OF HIGH ENERGY RADIATION ON THE MECHANICAL PROPERTIES OF EPOXY GRAPHITE FIBER REINFORCED COMPOSITES Progress Report, 1 Jan. - 31 Dec. 1983
R. D. Gilbert, R. E. Fornes, and J. D. Memory 31 Dec. 1983 24 p
(Grant NsG-1567)
(NASA-CR-173293; NAS 1.26:173293) Avail: NTIS HC A02/MF A01 CSCL 11D

The effects of high energy radiation on mechanical properties and on the molecular and structural properties of graphite fiber reinforced composites are assessed so that durability in space applications can be predicted. A listing of composite systems irradiated along with the maximum radiation dose applied and type of mechanical tests performed is shown. These samples were exposed to 1/2 MeV electrons. S.L.

N84-17293*# Rensselaer Polytechnic Inst., Troy, N. Y.
COMPOSITE STRUCTURAL MATERIALS Semiannual Progress Report, 30 Apr. - 30 Sep. 1983
George S. Ansell, Robert G. Loewy, and Stephen E. Wiberley Dec. 1983 190 p
(Grant NGL-33-018-003)
(NASA-CR-173259; NAS 1.26:173259; SAPR-45) Avail: NTIS HC A09/MF A01 CSCL 11D

Progress and plans are reported for investigations of: (1) the mechanical properties of high performance carbon fibers; (2) fatigue in composite materials; (3) moisture and temperature effects on the mechanical properties of graphite-epoxy laminates; (4) the theory of inhomogeneous swelling in epoxy resin; (5) numerical studies of the micromechanics of composite fracture; (6) free edge failures of composite laminates; (7) analysis of unbalanced laminates; (8) compact lug design; (9) quantification of Saint-Venant's principles for a general prismatic member; (10) variation of resin properties through the thickness of cured samples; and (11) the wing fuselage ensemble of the RP-1 and RP-2 sailplanes. A.R.H.

N84-17294# Wyoming Univ., Laramie. Dept. of Mechanical Engineering.
A STUDY OF POLYMER MATRIX FATIGUE PROPERTIES Final Report, Sep. 1979 - Feb. 1983
E. M. Odom and D. F. Adams Warminster, Pa. Naval Air Development Center Jun. 1983 120 p
(Contract N62269-80-C-0278)
(AD-A135076; UWME-DR-301-103-1; NADC-83053-60) Avail: NTIS HC A06/MF A01 CSCL 11/4

Hercules 3501-6 neat epoxy and Hercules X4001 neat bismaleimide specimens were fabricated and tested, both statically and in cyclic fatigue. Axial tensile and torsional shear loadings were utilized, at room temperature and 88 C. Detailed procedures are given for casting good quality specimens of these high performance structural polymers in neat (unreinforced) form. Techniques are also presented for gripping the specimens for mechanical loading, with special emphasis on problems which can be anticipated during fatigue cycling. Although there was scatter in the fatigue data for these relatively brittle polymers, the S-N curves exhibited a knee at about 10,000 cycles. That is, an endurance limit is suggested, which it may be possible to correlate with corresponding composite material response. Extensive scanning electron microscopy (SEM) was performed on the neat resin fracture surfaces. Failure initiation sites and a consistent pattern of crack propagation were exhibited. The observations suggest that the failures of the torsion specimens were consistently via tensile mode, characteristic of brittle materials. Correlations were made between the relative sizes of the fractures observed, and the static strengths and fatigue lives of the materials. Author (GRA)

N84-17295# Acurex Corp., Mountain View, Calif.
DISCLINATIONS IN CARBON-CARBON COMPOSITES Annual Report, No. 2, Jul. 1982 - Jul. 1983
J. E. Zimmer and R. L. Weitz Sep. 1983 83 p
(Contract N00014-81-C-0641)
(AD-A135248; TR-83-21/ATD) Avail: NTIS HC A05/MF A01 CSCL 11/4

Disclinations are prominent in the matrix microstructure of carbon-carbon composites and are introduced via the formation of the carbonaceous mesophase, a discotic nematic liquid crystal. The structure-sensitive physical properties of these composites are expected to be related to their microstructure and the disclination structures in the microstructure. The objectives of this research are to identify and classify the disclination structures in the matrix of carbon-carbon composites and to determine the relationship of the disclinations to the fracture behavior of the composite matrix. The three dimensional structure of disclination arrays in the carbonaceous mesophase has been delineated by optical micrography on successive parallel planes of section. The disclinations intersected each plane of section, denoting a line character to the central core of the disclinations. This analysis showed that the disclinations lines (cores) are generally curved and can interact by two disclinations joining to form a single disclination or by one disclination separating to form two disclinations. Disclination theory requires that for such disclination interactions, the total strength or rotation of the disclinations must be conserved. The evidence obtained in this study supports this requirement. This mapping of the three dimensional structure of the disclination arrays provides a better insight into the complex microstructure of carbon-carbon composites. GRA

N84-17296# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structures and Dynamics Div.
EFFECTS OF JP-4 FUEL ON GRAPHITE/EPOXY COMPOSITES Final Report, Mar. 1977 - Oct. 1982
B. L. White Oct. 1983 44 p
(AF Proj. 2401)
(AD-A135416; AFWAL-TR-83-3086) Avail: NTIS HC A03/MF A01 CSCL 11/4

The primary objective of this program was to determine if

structural properties of graphite/epoxy composite laminates could be degraded by subjecting the material to JP-4 fuel under pressure for an extended period of time. The investigation consisted of three extended evaluations in which a total of 305 specimens were tested in various modes. The study dealt primarily with tensile testing of fuel and ambient environment exposed laminates and oven dried laminates to determine relative strength values. The data shows little to no degradation of the Hercules AS 3501-5A graphite/epoxy material properties after being exposed to JP-4 fuel at a 40 psi pressure for six months. Author (GRA)

N84-17297# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
COMPARISON OF THE CHARACTERISTICS OF GRAPHITES IRRADIATED AT 600 AND 9000 DEG C
C. R. Kennedy, W. P. Eatherly, and D. Minderman (Kernforschungsanlage Juelich) 1983 6 p refs Presented at the 16th Am. Carbon Soc. Bien. Conf., La Jolla, Calif., 17 Jul. 1983
(Contract W-7405-eng-26)
(DE83-015695; CONF-830711-7) Avail: NTIS HC A02/MF A01

Graphite for the reflector in the pebble-bed High Temperature Reactor in the Federal Republic of Germany (FRG) requires exceptional irradiation resistance for economic viability. The candidate graphites are being irradiated in the High Flux Isotope Reactor (HFIR) at Oak Ridge to assess their irradiation life expectancy. This assessment is based upon dimensional stability, elastic constants from sonic testing, electrical resistivity from eddy-current testing, coefficient of thermal expansion, and brittle-ring fracture testing. To date 13 FRG grades were irradiated and compared with four graphites made in the United States and one from the United Kingdom. The irradiation temperatures were 620, 715, and 900 C. DOE

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N84-17298# British Library Lending Div., Boston Spa (England).
CHEMICAL AND ELECTROCHEMICAL PROPERTIES IN MOLTEN ALKALINE HYDROXIDES
B. Tremillon and R. G. Doisneau 21 Nov. 1983 22 p refs Transl. into ENGLISH from J. de Chim. Phys. (France), v. 71, no. 10, 1974
(BLL-Risley-Tr-4854-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

Experimental studies of chemical and electrochemical properties in solution in molten hydroxides and, in particular, those carried out in the eutectic NaOH + KOH at 500 K have shown the very great interest of these reactive media. Their principal characteristic is an extremely strong basicity which varies considerably. The essential properties of these media are examined by looking at the effects of changes in metallic cations (alkaline and eventually alkaline earth) associated with anion hydroxide as well variation in temperature. Likewise, the problem of water-hydroxide mixtures, intermediary between aqueous solutions and molten hydroxides was considered. To establish this general picture, use was made of experimental data from the literature. Electrochemical tests which corroborate some of the results thus anticipated will be described in a later work. The acid-base properties of the molten hydroxides are of interest. Author

N84-17299 British Library Lending Div., Boston Spa (England).
CHEMICAL AND ELECTROCHEMICAL PROPERTIES IN MOLTEN ALKALINE HYDROXIDES. 3: OXIDE AND ACID COMPLEXES OF SOME METALLIC CATIONS
Jean Goret and Bernard Tremillon 19 Dec. 1983 16 p refs Transl. into ENGLISH of "Proprietes Chimiques et Electrochimiques dans les Hydroxydes Alcalins Fondus. 3: Complexes Oxyde et Acidite de Quelques Cations Metalliques" rept. No. 481 CNRS, Paris
(BLL-Risley-Tr-4858-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

The apparent acidity of the solvated metallic cations in molten eutectic sodium hydroxide and potassium hydroxide is linked to their ability to accept O(2-) ions. The nature of the oxide complexes and the values of the acidity constants and the solubility products for some metallic cations were determined (at 227 C) as a function of the acidity of the medium. Author

N84-17300# British Library Lending Div., Boston Spa (England).
ON THE PROPAGATION LAWS OF COMBUSTION WAVES IN SOLIDS (PYROTECHNIC REACTIONS)
M. L. Bernard 30 Nov. 1983 7 p Transl. into ENGLISH from Propellants, Explosives, Pyrotechnics, v. 8, 1983 p 80-82
(BLL-Trans-1098-(7291.796S)) Avail: British Library Lending Div., Boston Spa, Engl.

The only theoretical models of the propagation of combustion waves in solids involve conductive heat transfer. The rate of propagation in a binary mixture of the metal oxidizer type is recalculated in a satisfactory manner from measurements of thermal diffusivity. The diameter of the particles has a very noticeable effect on this property. The variability of the kinetic properties of pyrotechnic compositions is represented by a characteristic curve which represents the slowness of propagation as a function of slowness of the reciprocal of the heat of reaction. Author

N84-17301# Materials Research Labs., Melbourne (Australia).
CONCENTRATION OF SULPHURIC ACID: PREMATURE FAILURE OF BAMAG POTS
Jeffrey J. Batten and Peter J. Knuckey May 1983 39 p refs Original contains color illustrations
(MRL-R-885; AR-003-297) Avail: NTIS HC A03/MF A01

In the Bamag process, dilute sulfuric acid (of about 70% strength) is reconcentrated to about 95% by boiling in a cast iron still pot. The acid for reconcentration flows down a packed column (dephlegmator), where its concentration during descent increases progressively, before the partially concentrated acid enters the pot via the base of the dephlegmator. In the pot it is further concentrated by boiling, and the concentrated acid overflows through a runoff pipe into an acid cooler and thence to storage at a rate determined by the input flow. Each pot contains about 10 tons of acid which is boiled and stirred. The operating life of a Bamag pot should exceed two years, but in recent times several of the operating pots have had a life of less than 5% of this figure. This extremely short life is due to localized corrosion in the vicinity of the outlet at the liquid surface level. The main factors that could contribute to this particular corrosion and to such a short life are examined. Observed corrosion problems during operation of similar pots at other plants are also discussed. S.L.

N84-17302*# National Aeronautics and Space Administration, Washington, D. C.
CONSIDERATIONS ON THE EXTERNAL COMBUSTION SYSTEM OF THE STIRLING HOT GAS ENGINE
F. Zacharias Feb. 1983 19 p refs Transl. into ENGLISH from Motortech. Z. (West Germany), v. 32, no. 1, Jan. 1971 p 1-5 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77026; NAS 1.15:77026) Avail: NTIS HC A02/MF A01 CSCL 21B

After an introduction on the Stirling engine the external combustion system as well as the general loss division and efficiencies are described. The requirements for the combustion system and different variants of the combustion system are compared and discussed. Author

N84-17303# Dayton Univ., Ohio. Dept. of Chemical Engineering.
PREDICTION OF AN APPARENT FLAME LENGTH IN A CO-

AXIAL JET DIFFUSION FLAME COMBUSTOR Final Report, 1 Aug. 1982 - 31 May 1983
S. S. Sandhu 1 Apr. 1983 16 p
(Grant AF-AFOSR-0925-82; AF Proj. 2308)
(AD-A135088; UDR-TR-83-38; AFOSR-83-0873TR) Avail: NTIS HC A02/MF A01 CSCL 21/2

This report is comprised of two parts. In Part 1 a predictive model for an apparent flame length in a co-axial jet diffusion flame combustor is described. According to this model a diffusion flame is considered as thin cylindrical reactive zone composed of chemically active and dead regions. Fuel consumption by surface oxidation is assumed. Mass transport of oxygen to the reactive surface is considered to control the overall combustion process. Overall mass transfer coefficient, evaluated from an empirically developed correlation, is employed to predict total flame length. Comparison of the experimental and predicted data on total flame length shows a reasonable agreement within sixteen percent over the investigated air and fuel flow rate ranges of 1-2kg/s and 5-11kg/hr, respectively. In Part 2 a scheme to predict an apparent flame length is described for the circumstances when a recirculation region established immediately downstream of a center-body in a co-axial jet combustor is penetrated by a central fuel jet. A turbulent jet flow theory has been coupled with the theory given in Part 1 of the report. GRA

N84-17304# Illinois State Univ., Normal.
MOLTEN SALT ELECTROCHEMICAL SYSTEMS Final Report, 1 Jun. 1980 - 31 Mar. 1983
R. K. Bunting 31 May 1983 14 p
(Grant AF-AFOSR-0173-80; AF Proj. 2303)
(AD-A135108; AFOSR-83-0900TR; FR-3) Avail: NTIS HC A02/MF A01 CSCL 07/2

Thermal properties are reported for a variety of materials that have been investigated for their potential application as components of molten sodium tetrachloroaluminate electrolytes, notably fluoroarsenates, fluoroborates and closochloroborates. Effects of catron structure on the stability and spectroscopic properties of tetrachlorocobaltate are also reported. Author (GRA)

N84-17305# Northwestern Univ., Evanston, Ill. Dept. of Chemistry.
CHLORIDE ION CONDUCTIVITY IN A PLASTICIZED QUATERNARY AMMONIUM POLYMER Interim Technical Report
L. C. Hardy and D. F. Shriver 22 Nov. 1983 19 p Submitted for publication
(Contract N00014-80-C-0532; NR Proj. 359-746)
(AD-A135373; TR-08) Avail: NTIS HC A02/MF A01 CSCL 07/2

Chloride ion conductivity in anhydrous, plasticized, quaternary ammonium polymer solid electrolytes is studied. Curved plots of ln(sigma T) vs. 1/T indicate that transport of ions in these materials may be described by WLF-type equations. AC complex impedance measurements for the ranges 5 Hz-500 kHz and 26-98 C with ion-blocking Pt electrodes and ion-reversible calomel electrodes show that the chloride ion is mobile. Conductivities measured range from 7 x .001 to 3 x 10 to the minus 4th power/ohms/cm depending on the plasticizer level and temperature. GRA

N84-17306# Northwestern Univ., Evanston, Ill.
BIFURCATION AND STABILITY THEORY WITH APPLICATION TO PROBLEMS OF COMBUSTION AND FLAME PROPAGATION Final Report, 15 Sep. 1977 - 31 May 1983
Bernard J. Matkowsky 30 Oct. 1983 9 p
(Contract DAAG29-79-C-0183; Grant DAAG29-77-G-0222)
(AD-A135383; ARO-15486.17-MA; ARO-16537.19-MA) Avail: NTIS HC A02/MF A01 CSCL 21/2

Discussed is a research program in Bifurcation and Stability Theory with applications to Combustion and Flame Propagation, which determined both qualitative and quantitative behavior of solutions of theses problems. Results on the transition from laminar to turbulent combustion were obtained. Various simplified models from the general equations governing combustion, which were more amenable to mathematical analysis were derived. The methods of bifurcation and stability theory were then employed on the resulting models. A list of all the papers published, is appended. In addition a list of scientific personnel participating in the research program is appended. GRA

N84-17307# Rutgers Univ., New Brunswick, N. J. Dept. of Chemistry.
IONIC CONDUCTIVITY OF Li7BiO6
E. Nomura and M. Greenblatt 3 Nov. 1983 7 p Submitted for publication
(Contract N00014-82-K-0317; NR Proj. 627-802)
(AD-A135386) Avail: NTIS HC A02/MF A01 CSCL 07/2

The ionic conductivity of polycrystalline Li7BiO6 pellets has been measured by complex impedance method. The conductivity is 5.7 x .001/ohms cm at 300 C and 3.8 x 10 to the minus 6th power/ohms cm at 100 C. Li7BiO6 is the best lithium conductor among the structurally related LinMO6 compounds. GRA

N84-17308# Defence Research Establishment Valcartier (Quebec).
CHEMICAL GENERATION AND DEACTIVATION OF OXYGEN SINGLET DELTA
S. A. Barton Oct. 1983 43 p
(AD-A135392; DREV-4310/83) Avail: NTIS HC A03/MF A01 CSCL 07/1

The construction and operation of a chemical generator of O2(a1 Delta g) are described. This system could be readily modified to drive a purely chemical iodine laser operating at 1.315 micrometer. Optical techniques were developed for estimating the excited oxygen concentration that arrives at a downstream cavity at total O2 pressures from 1 to 6 torr. Mechanisms that explain the deactivation of excited O2 in the gas stream are discussed. A value for the singlet delta energy-pooling rate constant is determined from the measured O2(a1 Delta g) concentrations. GRA

N84-17309# California Univ., Berkeley. Dept. of Chemistry.
CROSSED MOLECULAR BEAM STUDIES OF THE REACTIONS OF OXYGEN AND FLUORINE ATOMS Final Technical Report, 1 Apr. 1975 - 30 Sep. 1983
Y. T. Lee 9 Nov. 1983 29 p
(Contract N00014-75-C-0671; NR Proj. 092-545)
(AD-A135415) Avail: NTIS HC A03/MF A01 CSCL 07/4

The title of this research contract describes the initial work done under the contract; after 1980 the research program was extended to the study of the primary decomposition of energetic materials and the dynamics of concerted reactions of organic molecules through cyclic transition states. The studies of the primary photodissociation of polyatomic molecules have been directed toward answering questions related to the primary decomposition of energetic materials and the dynamics of concerted reactions. A combination of the techniques of infrared multiphoton excitation and the molecular beam method has been used to carry out a series of these studies. In particular, the competition between simple bond fission reactions and concerted reactions were studied in detail in the infrared multiphoton dissociation of ethyl vinyl ether and diethyl ether. The primary photodissociation of ozone was studied as it is important both as a test for theoretical models and as a source of O(1D) atoms in the atmosphere. The photodissociation of the energetic molecules nitromethane was investigated at 266 and at 193 nm. While no significant (less than 3 percent) dissociation occurred at 266 nm, the 193 excitation led to dissociation to CH3 and NO2 with a large fraction of the NO2 product being electronically excited and highly vibrationally excited. The photodissociation of ketene allowed a determination of the singlet-triplet splitting in methylene. GRA

N84-17310# Kansas State Univ., Manhattan. Dept. of Chemistry.
EXCITED STATE KINETICS OF MERCURY HALIDES AND MIXTURES WITH N2 AND Xe Final Report
D. W. Setser 28 Nov. 1983 7 p
(Contract N00014-80-C-0346)
(AD-A135432) Avail: NTIS HC A02/MF A01 CSCL 07/4

Experimental kinetic measurements were made for mercury and mercury halide systems that have relevance for mercury halide lasers operating on the B-X transitions. The quenching of Hg(3P2) atoms by halogens, the vibrational relaxation of HgCl(B) and HgBr(B), and the dissociative excitation transfer from N2(A) and Xe(3P2,1) to HgCl2, HgBr2, CH3HgCl, CH3HgBr and CH3HgI were studied. In addition, relaxation processes in the triplet states of N2 were investigated; the very facile coupling between the N2(W) and N2(B) and N2(B) states was discovered and studied at the state-to-state level. Author (GRA)

N84-17311# Princeton Univ., N. J. Applied Physics and Materials Lab.

A PHOTOACOUSTIC STUDY OF CHEMICALLY ACTIVE SYSTEMS Final Report

B. S. H. Royce Sep. 1983 26 p

(Contract DAAG29-80-C-0053)

(AD-A134663; APML-150983; ARO-16865.13-CH) Avail: NTIS HC A03/MF A01 CSCL 07/4

The method of gas-microphone photoacoustic spectroscopy and the related photothermal deflection spectroscopy have been developed for application to chemically active systems. Fourier Transform Infrared Photoacoustic Spectroscopy has been used to study surface reactions on zeolites and photopolymerization reactions in acrylates. In both cases the chemical reactions were initiated in the photoacoustic cell and followed in situ. The catalytic studies were carried out in a cell with a high temperature capability of 400 C and cell design permitted gas flows through the cell during data acquisition. The photopolymerization experiments were conducted at room temperature but employed control of the gas phase above the sample to evaluate the effects of oxygen radicals on surface photopolymerization. Photothermal deflection spectroscopy has been applied to the study of electrode electrolyte interfaces during electrochemical or photoelectrochemical reactions. Surface spectroscopic studies made in situ have enabled corrosion processes to be followed and an extension of the technique using concentration gradient produced signals has permitted charge transfer to electrolyte ions and electrode dissolution processes to be followed. GRA

N84-17312# Applied Combustion Technology, Inc., Orlando, Fla.

EXPANDED IGNITION EFFECTIVENESS TESTS OF SELECTED IGNITER MATERIALS WITH NAVY PROPELLANTS Final Report, Oct. 1982 - Sep. 1983

A. M. Varney and J. Martino Sep. 1983 133 p

(Contract N00174-81-C-0453)

(AD-A134704; ACT-TR-8147) Avail: NTIS HC A07/MF A01 CSCL 21/2

Diagnostic ignition experiments have been conducted using a high-pressure flow through combustor to evaluate the ignition effectiveness of black powder, boron potassium nitrate, magnesium-teflon-viton, nitrocellulose, boron molybdenum trioxide and ammonium perchlorate with five propellants--NACO, NOSOL-318, NOSOL 363, LOVA, and PYRO. Twenty-one series of experiments have been conducted to determine the ability of various igniter materials to ignite gun propellants beyond the immediate vicinity of the gun igniter--that is after filtering through and being cooled by an inert propellant stimulant zone positioned between the igniter and the live propellant. The ignition effectiveness has been determined quantitatively by the amount of igniter thermal energy, based on its heat of explosion, required to ignite a propellant 50 percent of the time. Analyses and results are given which present the relative effectiveness of the igniter materials in terms of the different ignition stimuli (e.g., gases, liquids, and solids ratios). Author (GRA)

N84-17313# Naval Research Lab., Washington, D. C.

DEPENDENCE OF THERMOLUMINESCENCE OUTPUT ON TEMPERATURE DURING IRRADIATION FOR SEVERAL THERMOLUMINESCENCE PHOSPHORS Final Report

K. J. King and T. L. Johnson 30 Sep. 1983 13 p

(AD-A134940; NRL-8761) Avail: NTIS HC A02/MF A01 CSCL 20/6

Several thermoluminescence phosphors were irradiated at elevated temperatures to determine if the thermoluminescence output was increased. Of the phosphors tested, only LiF:Mg showed any significant increase. Part of this increase can be attributed to annealing effects in the phosphor before and after exposure, while the remainder appears to be intrinsic to the phosphor temperature during the deposition of energy. Author (GRA)

N84-17314# George Washington Univ., Washington, D.C. Dept. of Chemistry.

COMPARISON OF PHOTON STIMULATED DISSOCIATION OF GAS PHASE, SOLID AND CHEMISORBED WATER

D. E. Ramaker Sep. 1983 26 p

(Contract N00014-80-K-0852)

(AD-A134986; AD-E401102; TR-10) Avail: NTIS HC A03/MF A01 CSCL 07/4

Recent electron-and-photon-stimulated desorption (ESD/PSD) data for H2O in the condensed phase and chemisorbed on GaAs(110) and Ti(001) are interpreted utilizing previously published photoelectron, electron coincidence and Auger data along with theoretical calculations. Comparison with fragmentation data from the gas phase indicates that only two hole-one electron type states are effective for desorption in condensed or molecularly chemisorbed hydrogen bonded water. The 1b(sub2)-1 excitation, which effectively dissociates H2O gas via predissociation, is ineffective in the condensed phase because of the presence of intermolecular decay mechanisms which compete with the predissociation process. Hydrogen bonding reduces the effectiveness of the 2a(sub2)-1 excitation for H+ desorption. The 1b(sub1)-1 4a(sub1) two hole-one electron states are sufficiently long lived; occupation of the strongly antibonding 4a orbital also makes them repulsive. These properties make the two hole-one electron states the most persistent for H+ desorption from the H2O phase studied. The core level PSD spectrum from solid D2O is also interpreted. All of the results are found to be comparable to previously reported results for CO. GRA

N84-17315# Geo-Centers, Inc., Newton, Mass.

QUANTITATIVE SECONDARY ION MASS SPECTROSCOPY (SIMS)

Jul. 1983 40 p

(Contract N00014-82-C-2099)

(AD-A134195; AD-E850416; GC-TR-83-269) Avail: NTIS HC A03/MF A01 CSCL 20/12

This report describes in detail the use of the Cameca IMS-300 ion microscope for both quantitative analysis of sophisticated electronic devices and qualitative evaluation of ion implanted metals. The use of Secondary Ion Mass Spectroscopy (SIMS) in depth profiling adds a new dimension to surface analysis, enabling small concentrations of species which were previously undetectable to be determined. By being able to distinguish the differences in mass, isotopic techniques permit the elucidation of mechanisms which are responsible for the formation of wear resistant, low friction surfaces associated with titanium implantation into steels. GRA

N84-17316# Los Alamos Scientific Lab., N. Mex.

EQUATION OF STATE OF FLUID NH-3 FROM P-V-T AND ULTRASOUND MEASUREMENTS TO 12 KBAR

R. L. Mills, D. H. Liebenberg, and P. Pruzan (Paris 6 Univ., France) 1983 9 p refs Presented at the AIRAPT Conf., Albany, 25 Jul. 1983 Sponsored in part by NATO

(Contract W-7405-eng-36)

(DE83-015913; LA-UR-83-2190; CONF-830763-9) Avail: NTIS HC A02/MF A01

A piston cylinder apparatus was used to measure the pressure, volume, temperature, and ultrasonic velocity (P,V,T,U) of fluid NH3 from 195 to 320 K at pressures up to 12 kbar. Over 1200 sets of P-V-T-U and P-V-T data were fitted to a Tait type equation of state (EOS) by nonlinear least squares minimization. With quadratic terms in T for the two fitted parameters, the rms derivation is + or - 2% in V and + or - 9% in u, which is comparable to the experimental error. The simple Tait EOS is useful over the entire

fluid range between the vaporization and melting curves up to T exceeding room temperature. Measurements of u and calculations of the constant pressure heat capacity Cp show regular behavior. It is concluded that incorporating u or Cp in the formulation of an EOS improves its self consistency. DOE

N84-17317# Stanford Univ., Calif. High Temperature Gasdynamics Lab.

TECHNIQUE FOR THE RAPID GENERATION OF OH RADICALS BEHIND SHOCK WAVES AND ITS APPLICATION TO THE STUDY OF COMBUSTION KINETICS

Attila Szekely, Ronald K. Hanson, and Craig T. Bowman 1983 18 p refs Presented at the Combustion Inst. Fall Meeting of the Western States Section, Los Angeles, 17-18 Oct. 1983

(Contracts DE-AT03-76ER-70068; DE-AM03-76SF-00326)

(DE84-003183; CONF-8310201-2) Avail: NTIS HC A02/MF A01

A technique for the fast, thermal generation of hydroxyl radicals behind shock waves, useful for the controlled study of elementary reactions involving OH, was developed. The technique is based on the fact that the room-temperature equilibrium of the reaction NO + NO2 + H2O reversible 2HNO2 favors the production of HNO2 (nitrous acid). At the high temperatures present behind shock waves, HNO2 dissociates rapidly to OH and NO, providing a fast, controllable source of hydroxyl radicals. By measuring the concentration time-history of the OH thus generated in the presence of known amounts of reactants (such as hydrocarbons), the rate coefficient of the generic reaction OH + Re (FEMALE) products (Re = reactant) are inferred. For illustrative purposes, the method was applied to the determination of the relatively well-known rate coefficients of two reactions of interest in combustion, OH + OH (FEMALE) O + H2O and OH + CH4 (FEMALE) CH3 + H2O. DOE

N84-17318# Los Alamos Scientific Lab., N. Mex.

MANUAL OF ANALYTICAL METHODS FOR RADIOBIOASSAY

Margaret A. Gautier, comp. Jul. 1983 163 p

(Contract W-7405-eng-36)

(DE84-003978; LA-9763-M) Avail: NTIS HC A08/MF A01

The manual contains procedures and methods used for the isolation, identification, and quantitative determination of radionuclides in bioassay samples. The methods measure the concentration of the desired analytes with the precision, accuracy, and specificity required by health physics dosimetry. The procedures utilize equipment and skills available in modern radiochemistry laboratories. Precision and accuracy statements derived from quality control studies at the laboratory are provided. This manual includes radiometric procedures for the analysis of bioassay samples for (241)Am, (137)Cs, Gross Beta, (32)P, (21)0Po, (238) (239)Pu, (3)T, (235) (238)U. Colorimetric procedures for Th and U are also included. Each procedure is presented in a simple and concise manner and includes sample collection and storage, interferences, apparatus, reagent preparation, calibration methods, and data reduction formulas. DOE

N84-17319# Los Alamos Scientific Lab., N. Mex.

DETECTION OF ELEMENTS IN BIOMEDICAL FLUIDS BY LASER-INDUCED BREAKDOWN SPECTROSCOPY

Thomas Robert Loree 1983 25 p refs Presented at the Intern. Congr. on Appl. of Lasers and Electro-Opt., Los Angeles, 15-17 Nov. 1983

(Contract W-7405-eng-36)

(DE84-003838; LA-UR-83-3391; CONF-831195-3) Avail: NTIS HC A02/MF A01

Laser-induced breakdown spectroscopy was used for the qualitative elemental analysis of human blood, sweat, and serum. The detection of most trace elements, especially metals, is demonstrated. DOE

N84-17320# Stanford Univ., Calif. Lab. for High Temperatures Gasdynamics.

COMBUSTION GAS SPECTROSCOPY USING TUNABLE LASERS Progress Report, 1 Jan. - 30 Sep. 1983

R. K. Hanson 1983 9 p refs

(Contract DE-AT03-76ER-70058)

(DE84-004976; DOE/ER-70058/T2) Avail: NTIS HC A02/MF A01

During this reporting period, work has proceeded in several areas. Highlights include: tunable diode laser measurements of HCN infrared absorption line strengths and lineshapes at room temperature; an advanced absorption lineshape model, including collision narrowing as well as Doppler and collision broadening effects, and its application to high-resolution absorption spectra of HCN; the temperature dependence of collision-broadened linewidths of HCN at high temperatures; and a technique for rapidly tuning a frequency doubled ring dye laser was developed. DOE

N84-17321# Heraeus (W. C.) G.m.b.H., Hanau (West Germany). Produktionsbereich Chemie.

NEW PROCESS FOR RECYCLING OF RHODIUM AND IRIDIUM FROM OLD CATALYSTS Final Report, Dec. 1980

Harald Erhard, Wilfried Hoerner, and Franz Kummer Bonn Bundesministerium fuer Forschung und Technologie Aug. 1983 91 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-179; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,50

Recovery of rhodium and iridium from spent catalyst by selective dissolution is considered. The spent catalyst was reduced, impregnated and chlorinated. After dissolution of rhodium and iridium, rhodium was separated by electrolysis, whereas iridium could not be reduced to the metal. It is, however, feasible to recover iridium by solvent extraction. A separation rate > 90% is obtained for both metals. Author (ESA)

N84-17322# Bayer A.G., Leverkusen (West Germany). Div. Polyurethane Research.

HYDROLYSIS OF PLASTIC WASTES WITH THE AIM OF RECOVERING AND REPROCESSING THE STARTING COMPONENTS (RECYCLING) Final Report, Aug. 1981

Georg Niederdellmann, Hartmut Hetzel, and Harald Petersen Bonn Bundesministerium fuer Forschung und Technologie Sep. 1983 183 p refs In GERMAN; ENGLISH summary

(Contract BMFT-03-VM-018-A/C-027)

(BMFT-FB-T-83-199; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 35

Recycling of flexible polyurethane (PUR) foam is described. A continuous hydrolyzing and separation process was developed. The energy content of the hot hydrolyzate was used for separating it into polyol and toluyene diamine (TDA). A TDA separation rate of > 90% is obtained. It is concluded that the recycling of industrial PUR foam waste is feasible. Author (ESA)

N84-17323# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).

PILOT SYSTEM FOR THE PURIFICATION OF RINSE WATER AND FOR THE RECUPERATION OF METALS IN ELECTROPLATING COMPANIES. PILOT SYSTEM METAL RECOVERY FROM WASTE WATER (RMA) Final Report, Oct. 1982

Fred Reinhard and Manfred Gold (Inovan-Stroebe GmbH und Co. KG) Bonn Bundesministerium fuer Forschung und Technologie Oct. 1983 158 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-208; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 32

A pilot system for purification, circulation of rinse water, and metal recuperation is reported. System-ion exchange columns in 45 electroplating companies were investigated. A central plant (regeneration of ion exchangers and metal recuperation) and a service system were established. An ecological balance was established and the economics of the system were examined. The salt load is reduced by 90%. About 1.2 tons of heavy metal is recovered from 7.5 tons of galvanic sludge. Author (ESA)

N84-17324# National Bureau of Standards, Washington, D.C.
LOOK AT TECHNIQUES FOR THE DIMENSIONAL CALIBRATION OF STANDARD MICROSCOPIC PARTICLES Final Report
Dennis A. Swyt Sep. 1983 153 p refs
(PB84-112648; NBS/SP-260-85; LC-83-600571) Avail: NTIS HC A08/MF A01 CSCL 07D

Generic techniques for the dimensional calibration of microscopic particle size standards are surveyed. User needs and available instrumentation, documentary standards, and commercial, sized particles are noted. The elements of the measurement process, including the particle and medium, size-dependent phenomena, shape factors, single-number indices of average size, and means of length calibration are discussed. Systematic differences among published results of electron microscopy, light scattering, particle counter, and other measurements on widely-used commercial polymer spheres are examined. The definitive calibration of narrow-distribution polymer spheres, a prerequisite first step toward calibration of irregularly-shaped matter, would best involve a three-element approach involving the techniques named. GRA

N84-17325# National Bureau of Standards, Washington, D.C. National Measurement Lab.
OZONE REACTIONS IN AQUEOUS SOLUTIONS: A BIBLIOGRAPHY Final Report
Francis Westley 1983 24 p
(PB84-109883; NBS-SP-655; LC-83-600538) Avail: NTIS HC A02/MF A01 CSCL 07D

A reaction oriented list of references is provided for published papers and reports containing rate data or information on mechanism for reactions of ozone with various substrates in aqueous solutions. Catalyzed, as well as uncatalyzed, reactions are included. One hundred and sixty-four papers are listed. The period covered extends from 1913 to 1981. GRA

N84-17326# California Univ., Berkeley. Dept. of Mechanical Engineering.
FIRE PROPAGATION IN CONCURRENT FLOWS Final Progress Report, 1 Jun. 1982 - 31 May 1983
A. C. Fernandez-Pello May 1983 77 p refs
(PB84-100155; NBS/GCR-83/43) Avail: NTIS HC A05/MF A01 CSCL 21B

A study was performed of the process of fire spread in gaseous flows moving in the direction of flame propagation, i.e., concurrent or flow assisted flame spread. Two research efforts are included: (1) Natural convection, flow assisted, flame spread over enclosure's walls; (2) Flame spread over a flat surface in a concurrent forced flow. A numerical analysis was performed of the natural convection, steady burning of combustible surfaces of varied length and composition forming the walls of an enclosure. The results for the location and length of the flame agree well with experimental data. Author (GRA)

N84-17327# California Univ., Berkeley. Lawrence Berkeley Lab.
STRUCTURE, INHIBITION AND EXTINCTION OF POLYMER DIFFUSION FLAMES
William John Pitz Jul. 1983 122 p refs Sponsored in part by DOE
(Grant NBS-NB-805180)
(PB84-101336; NBS/GCR-83/436) Avail: NTIS HC A06/MF A01 CSCL 21B

Composition and temperature profiles for combustion of high-purity polyethylene polymer in the opposed flow of a gaseous oxygen-nitrogen stream were obtained to examine the flame structure near extinction. As the oxygen concentration in the oxidizer was reduced, the flame moved toward the surface, the position of unity equivalence ratio moved away from the surface, and the maximum flame temperature decreased. Surface oxidation reactions were of minor importance. Halogenated inhibition effectiveness was assessed by evaluating its influence on extinction limits. The order of increasing effectiveness was found to be chlorine in the oxidizer flow, chlorine in the polymer, and bromine in the oxidizer flow. GRA

N84-17328# National Bureau of Standards, Washington, D.C.
JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS. VOLUME 88, NUMBER 3, MAY-JUNE 1983
Jun. 1983 83 p refs
(PB84-115799; LC-83-37059) Avail: NTIS HC A05/MF A01 CSCL 07D

The determination of trace levels of Cyanide by ion chromatography with electrochemical detection; Estimated uncertainty of calculated liquefied natural gas density from a comparison of NBS and Gaz de France densimeter test facilities; The application of back-to-back accelerometers to precision vibration measurements; Nuclear Orientation thermometry; and List of publications of the National Bureau of Standards. GRA

N84-17329# National Bureau of Standards, Boulder, Colo. Chemical Engineering Science Div.
HYDROGEN SULFIDE PROVISIONAL THERMOPHYSICAL PROPERTIES FROM 188 TO 700 K AT PRESSURES TO 75 MPa
Robert D. Goodwin Oct. 1983 177 p refs Sponsored in part by the Gas Research Inst.
(PB84-122704; NBSIR-83-1694) Avail: NTIS HC A09/MF A01 CSCL 07D

Thermophysical properties of hydrogen sulfide are derived from physical properties data by using our nonanalytic equation of state, and are tabulated along isobars at integral temperatures. Results include vapor pressures, orthobaric densities, the second virial coefficient, the equation of state, the ideal gas state functions, compressibility factors, densities, derivatives of the P(rho,T) surface, heats of vaporization, internal energies, enthalpies, entropies, specific heats, fugacity coefficients, speeds of sound, and the Joule-Thomson inversion. Thermofunctions by another author are compared with present results. GRA

N84-17330# Texas A&M Univ., College Station. Dept. of Chemical Engineering.
THERMOPHYSICAL PROPERTIES OF GASEOUS CARBON DIOXIDE/WATER MIXTURES Final Progress Report, 1 Jan. 1981 - 30 Jun. 1983
Philip T. Eubank Sep. 1983 67 p refs
(Grant NSF CPE-80-23182)
(PB84-125228; NSF/CPE-83009) Avail: NTIS HC A04/MF A01 CSCL 07D

Progress is reported on an investigation of two CO2/H2O systems. Results are given for carbon dioxide, water, 10% H2O/90% CO2, although the water values have not yet been corrected for adsorption. Tables show the raw data for the carbon dioxide experiment and the apparatus constant N, second virial coefficient B, third virial coefficient C, and fourth virial coefficient D. Essentially the same values were obtained for N, B, and C whether the entire P-V-T surface was fit, whether a B,C fit was made for the single isotherms, or whether a B,C,D, fit was made for the single isotherms. Manuscripts on determining thermodynamic quantities by the Burnett-isochoric method and on an electrical matching, boil-off calorimeter, are included. GRA

N84-17331# Pennsylvania Univ., Philadelphia. Dept. of Physics.
PHOTOEMISSION SPECTROSCOPY AND THE OPTICAL PROPERTIES OF SURFACE Final Report, 1 Jan. 1980 - 30 Apr. 1983
Paul Soven Aug. 1983 31 p Sponsored by Gas Research Inst.
(PB84-100445; GRI-81/0177) Avail: NTIS HC A03/MF A01 CSCL 07D

A theoretical investigation of the photoemission and photoabsorption cross sections of N2 and C2H2 is presented. The study is based on a time-dependent local density approximation and attempts to account for dynamic interactions among the electrons in the molecules by use of an effective, time dependent internal screening field. Results, as indicated by comparison with experiment, are quite satisfactory for both the dynamic and static linear

optical properties of these molecules, and indicates the notion of dynamic screening of an external field is a useful one for computing optical properties of many electron systems. GRA

N84-17332# Rice Univ., Houston, Tex. Dept. of Chemical Engineering.
CONFORMAL SOLUTION METHODS BASED ON THE HARD CONVEX BODY EXPANSION THEORY, SECTION 1 Annual Report, Jan. - Dec. 1982
Thomas W. Leland and K. H. Naumann 1983 73 p refs Sponsored by Gas Research Inst.
(PB84-100940; GRI-82/0094) Avail: NTIS HC A04/MF A01 CSCL 07D

The improvements are designed to give better property prediction for systems containing moderately and strongly polar constituents, for systems containing hydrogen, and for systems containing non-spherical molecules such as hydrogen sulfide and carbon dioxide. The procedure is basically designed for use with computers. The mixture properties obtained are compressibility factors, enthalpy, entropy, and densities of liquids and vapors at both high and low pressures from cryogenic temperatures to reservoir conditions. Equilibrium K-values are predicted simultaneously. These properties are essential for: design of heat exchangers, compressors, turbo-expanders, and separation processes for gases and liquids; calculations of dew points and bubble points; predicting phase changes, and reservoir operations. Author (GRA)

N84-17333# United Technologies Research Center, East Hartford, Conn.
MECHANISMS AND REACTION DYNAMICS RELATED TO METHANE COMBUSTION Annual Report, May 1982 - May 1983
M. F. Zabielski 31 May 1983 31 p refs
(PB84-100932; GRI-82/0082; UTRC-R83-956114-12) Avail: NTIS HC A03/MF A01 CSCL 21B

Fundamental information on mechanisms of combustion initiation in methane flames, propagation processes in the cool regions of these flames, and the growth and decay of so called 'prompt' NO was obtained. Detailed measurements of major and minor constituents were made with molecular beam sampling mass spectrometry and optical spectrometry. Comparisons between the experimental data and modeling results highlight the limitations of accepted nitrogen chemistry. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N84-17334# Overseas Relations Branch Translation Service, London (England).
APPLICATIONS OF SOLVENT EXTRACTION IN HYDROMETALLURGY
S. Amer 3 Jan. 1984 18 p refs Transl. into ENGLISH from Rev. Metal. CENIM (Spain), v. 18, no. 3, 1982 p 175-180
(BLL-OA-Trans-3162-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

Chromium, like vanadium and many other transition elements, has various valencies, basically 2, 3 and 6, although it has strong reducing properties in the divalent state which is, therefore, not very stable. The chromium salts normally used correspond to valencies 3 and 6 in which the element has a greater stability. Hexavalent chromium occurs in the form of chromate and dichromate anions which is readily extracted by means of various extracting agents, whilst trivalent chromium is frequently encountered in the form of complexes or as hydrated ion. This renders its extraction slower and more difficult than from chromates. Chromium is present in some minerals such as chromites. The extraction kinetics vary greatly with the valency in which this metal is found. Various methods of extraction are discussed. Author

N84-17335# Overseas Relations Branch Translation Service, London (England).
NITRIDING WITH A PULSED GLOW DISCHARGE
H. Wilhelmi, S. Straemke, and H. C. Pohl 30 Nov. 1983 24 p refs Transl. into ENGLISH from Harterei-Tech. Mitt. (West Germany), v. 37, no. 6, 1982 p 263-269 Presented at the 37th Haerterei Kolloquium, Wiesbaden, 7-9 Oct. 1982
(BLL-OA-Trans-3168-(6169.3)) Avail: British Library Lending Div., Boston Spa, Engl.

Although plasma nitriding has uncontested advantages, there are a number of drawbacks. For example, there is a relationship between current density and surface temperature. With complex forms, temperature differences and hardening defects may occur. By pulsing the gas discharge, the interrelationship of local current density and temperature was eliminated. The hardening achieved and the case structure are in keeping with the results obtained with the d.c.-nitriding process. Against the background of theoretical studies of the principles of plasma nitriding and extensive experimental studies, a pulsed plasma nitriding technique was developed and used as a standard process. A controlled mode of operation with a reduction in energy costs is realized. B.G.

N84-17336# Overseas Relations Branch Translation Service, London (England).
THE ELECTROCHEMICAL BEHAVIOUR OF TITANIUM PLATINUM ALLOYS IN ANODIC OXIDATION PROCESSES. 1: KINETICS AND SELECTIVITY OF THE PROCESS OF THE COMBINED FORMATION OF O2, H2S2O8 AND O3 ON THE TITANIUM-PLATINUM ALLOY
E. G. Kuznetsova, T. I. Borisova, and V. I. Veselovskii 31 Oct. 1983 16 p refs Transl. into ENGLISH from Elektrokhim. (USSR), v. 3, no. 11, 1967 p 1364-1369
(BLL-OA-Trans-3093-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

The electrochemical behavior of a titanium alloy with 10 wt% platinum was investigated during the combined formation of O2, H2S2O8 and O3. Potentiostatic polarization curves were recorded in a 12.3 N solution of H2SO4 in a wide temperature range (+20 to -30 C). The balance of the electrolysis products with respect to current was conducted for the regions of the preferential synthesis of H2S2O8. Alloying with Pt eliminates the negative properties of the anode-formed oxide films of titanium and the polarization curves of the alloy contain a kinetic portion corresponding to the generation of molecular oxygen at room temperature, whereas low temperature (-30 C) are also characterized by the appearance of portions corresponding to the processes of effective formation of H2S2O8 and O3. The selective directivity of the anodic reaction of the preferential synthesis of persulphuric acid on the alloy depends on the potential and temperature.
Author

N84-17337# Overseas Relations Branch Translation Service, London (England).
ELECTRODEPOSITION METHOD
28 Nov. 1983 6 p Transl. into ENGLISH of Japanese Patent No. 52(1977)-120925 (6 Apr. 1976)
(BLL-OA-Trans-3134-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

An electrodeposition method yielding electrodeposits with a smooth surface under a broad range of operating conditions and with a high productivity is presented. Author

N84-17338# Overseas Relations Branch Translation Service, London (England).
PRODUCTION OF TITANIUM POWDERS BY THE ELECTROLYSIS OF CHLORIDE-FLUORIDE MELTS WITH A SOLUBLE ANODE
V. V. Nerubashchenko, Yu. G. Olesov, V. I. Shapoval, and G. P. Dovgaya 28 Nov. 1983 7 p refs Transl. into ENGLISH from Tsvetn. Metally (USSR), no. 10, 1981 p 83-84
(BLL-OA-Trans-3136-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

Because of the considerable increase in the production and

consumption of titanium in various branches of industry, it is essential to improve the economic aspects of utilization of this metal. In the production of components of titanium alloys, the tailings amount to almost 75% of the mass of the charge used to produce ingots. The use of the powder metallurgy methods makes it possible to increase the coefficient of utilization of titanium from 20 to 30% to 65 to 85%, to reduce the labor content of machining by a factor of 1.5 to 2, and to reduce capital investment. Author

N84-17339# Overseas Relations Branch Translation Service, London (England).
PROCESS AND CELL ARRANGEMENT FOR PRODUCING DIFFICULT TO REDUCE ELEMENTS BY FUSED SALT ELECTROLYSIS
28 Nov. 1983 20 p Transl. into ENGLISH of Norwegian Patent No. 146064 (Appl. No. 801546, 23 May 1980)
(BLL-OA-Trans-3137-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

Process and cell arrangement for fused salt electrolytic production of difficult to reduce elements, particularly titanium, by cathodic deposition from fused chlorides to which during electrolysis chlorides of these elements are supplied. Decomposable anodes are used consisting of a porous layer of aluminum or magnesium. The electrolyte is made to flow through the porous anode layer in a direction away from the cathode and out of the cell, so that the AlCl3 or MgCl2 formed in the anode layer is prevented from taking part in the cathode process. In this way contamination of the desired element by aluminum or magnesium is avoided. Author

N84-17340# Overseas Relations Branch Translation Service, London (England).
METHOD AND APPARATUS FOR THE RAPID DETERMINATION OF GASES, OXYGEN IN PARTICULAR, AND OF THE COMBINED FORMS IN WHICH THEY ARE PRESENT IN METALS
R. Prumbaum and K. Orths 28 Nov. 1983 39 p refs Transl. into ENGLISH from Giesserei-Forsch. (West Germany), no. 2/3, 1979 p 71-82
(BLL-OA-Trans-3127-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

An automatic rapid technique was evolved for determining the quantity and combined forms of gases in metals. A temperature measuring arrangement and furnace control system for use with an infrared analyzer were developed which permit the controlled uniform heating of samples with temperature monitoring at the same time. The optimum heating rates and outputs of data were established for the determination of the differing combined forms of the oxygen present. The means whereby directly recorded oxide spectra are evaluated rapidly are explained, and evaluation via a directly connected computer or microprocessor is illustrated.
Author

N84-17341# British Library Lending Div., Boston Spa (England).
ADHESION STUDIES ON ION PLATED TIN STEEL
A. J. Perry 28 Nov. 1983 16 p refs Transl. into ENGLISH from Proc. of the 10th Plansee Seminar 1981, vol. 2 p 657-673
(BLL-Risley-Tr-4880-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

The scratch test for measurement of adhesion is used to assess the load bearing capacity of TiN coated onto 3 types of steel by reactive ion plating. The mode of coating removal is studied and the critical load for the onset of removal is measured. The results are interpreted as showing that the load bearing capacity varies with the coating thickness for a given steel substrate. Comparison with previous work indicates that the load bearing capacity of the present samples corresponds well to that of the previously studied chemical vapor deposition coating. R.J.F.

N84-17342# British Library Lending Div., Boston Spa (England).
THE PRACTICAL USE OF DATA AS TO THE SOLUTION ENTHALPIES OF MOLTEN Fe-V-Si
I. D. Rozhikhina and N. V. Tolstoguzov 1984 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR) p 12-15
(BLL-M-35430-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Calorimetric research was carried out to find the displacement enthalpies of molten Fe-V-Si alloys. On the basis of the coefficient of activity of vanadium the ideal silicon contacts of ferrosilicovanadium were determined. Author

N84-17343# British Library Lending Div., Boston Spa (England).
STUDY OF INTERMETALLIC COMPOUNDS IN TERNARY SYSTEMS Al-Ba-Nd AND Al-Ba-Yb
M. A. Zukhurtdinov, B. P. Burylev, I. T. Sryvalin, and A. V. Vakhobov 1983 9 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 8, 1983 p 87-93
(BLL-M-35387-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The Al-Ba-Nd and Al-Ba-Yb systems were studied using as many methods as possible to reveal ternary intermetallic compounds. Methods of physicochemical analysis were used for investigation and plotting of the complete phase diagram of the Al-Ba-Nd system. The liquidus surface of the Al-Ba-Yb system was investigated and plotted by the method of experiment design and a limited number of tests. Author

N84-17344# British Library Lending Div., Boston Spa (England).
METHOD OF HIGH-TEMPERATURE EXPANSIONS IN SHORT-RANGE ORDER THEORY
Yu. S. Stark and A. S. Shteinberg 1983 5 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 3, 1983 p 81-82
(BLL-M-35385-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The method of high temperature expansions is used for calculation of the equilibrium parameters of the short-range order in alloys. Author

N84-17345 Brown Univ., Providence, R. I.
AN EXPERIMENTAL AND NUMERICAL INVESTIGATION OF PRESSURE-SHEAR WAVES IN 6061-T6 ALUMINUM AND ALPHA-TITANIUM Ph.D. Thesis
Amos Gilat 1983 196 p
Avail: Univ. Microfilms Order No. DA8325978

The pressure-shear impact technique was used to study material behavior at high rates of deformation in 6061-T6 aluminum and commercially pure alpha-titanium tested under a variety of pressure and shear tractions. A laser interferometer simultaneously monitored normal and transverse components of the motion of a point at the rear surface of the target plate. The experimental results were compared with numerical solutions based on an elastic/viscoplastic model of the material. Both an isotropic and a kinematic strain hardening model were used in the computations. For both materials, the normal component of the particle velocity is insensitive to the hardening model used, and good agreement is observed between theory and experiment. The transverse component of the particle velocity is sensitive to the plastic flow characteristics of the material. The isotropic hardening model predicts a stiffer material response than observed while the kinematic hardening model predicts a softer material response than observed. Dissert. Abstr.

N84-17346 Pennsylvania Univ., Philadelphia.
STRUCTURAL AND ELECTROCHEMICAL PROPERTIES OF PLATINUM-TITANIUM LASER SURFACE ALLOYS Ph.D. Thesis
Scott Eric Slavin 1983 220 p
Avail: Univ. Microfilms Order No. DA8326332

Laser surface alloys of platinum and titanium on titanium substrated were examined to determine their structure and to see if they possess catalytic abilities and corrosion resistance similar to pure platinum. To investigate the structure and composition of the alloys, the following seven research techniques were employed: (1) Rutherford backscattering, (2) Auger electron microscopy, (3) Energy dispersive X-ray mapping, (4) X-ray diffraction, (5) Electron diffraction, (6) Scanning electron microscopy, and (7)

Transmission electron microscopy. The results of these experiments provided information about the anatomy of the laser melt spots. These melt spots have diameters between 10 and 24 microns and depths of approximately 5,000 angstroms. The centers of the melt spots are titanium rich while the perimeters are platinum rich. Average compositions were determined and related to the corrosion rates and to the catalytic activity on the laser surface alloys. Dissert. Abstr.

N84-17347 Brown Univ., Providence, R. I.
MICROSTRUCTURAL AND MECHANICAL ASPECTS OF FATIGUE CRACK INITIATION AND GROWTH IN A 2048 ALUMINUM ALLOY Ph.D. Thesis
Jai-Man Baik 1983 138 p
Avail: Univ. Microfilms Order No. DA8325949

The micro- and macro-mechanics of fatigue crack initiation and crack propagation in an age-hardenable 2048 aluminum alloy, which is the high purity version of 2024 or 2124 aluminum, and their relationship to localized plastic deformation was studied. Special attention was given to the importance of microstructure, including grain size and aging treatment in cyclic response and low cycle fatigue (LCF) behavior, crack growth along with the phenomena of crack tip closure, and on overload retardation effects. Crack closure was studied in detail and its use in describing crack growth was explored. Fracture toughness tests were performed and the results were compared with the K(Ic) value reported in literature. Discussion is also included on the experimental techniques used and should have quite general applicability in fracture mechanics theory. Dissert. Abstr.

N84-17348# Council for Scientific and Industrial Research, Pretoria (South Africa).
INTERNATIONAL CONFERENCE ON RECENT DEVELOPMENTS IN SPECIALTY STEELS AND HARD MATERIALS
1982 64 p Conf. held in Pretoria, 8-12 Nov. 1982 Sponsored in part by International Union of Pure and Applied Physics and International Association for the Advancement of High Pressure Research and Technology
Avail: NTIS HC A04/MF A01

The evolution of micro-alloyed steels from plain carbon steels is examined with emphasis on grain size control by use of Nb, Ti and V additions and by the application of controlled rolling. The structural changes during controlled rolling are described as well as the influence of alloying elements on these changes, and on the final microstructure. The achievement of high strength and toughness is discussed including the role of inclusions. Author

N84-17349# Council for Scientific and Industrial Research, Pretoria (South Africa). Foreign Language Service.
HEAT TREATMENT AND RESIDUAL AUSTENITE
Y. Meyzaud and C. Sauzay 1983 25 p refs Transl. into ENGLISH from Traitement Thermique (France), v. 81, 1974 p 33-42
(CSIR-Trans-1704) Avail: NTIS HC A02/MF A01

Austenite is incompletely transformed during quenching, with quite appreciable amounts of untransformed austenite, 'residual austenite', remaining at room temperature. Since this constituent affects a number of steel properties, a knowledge of the residual austenite content is a matter of some importance. Two questions arise, viz. as to the residual austenite content of a given heat treated workpiece; and, modification of the heat treatment which would result in an increase or decrease in austenite content. Recent studies provide a basis for a quantitative solution to the above-mentioned two problems with the aid of a nomograph indicating the percentage of residual austenite after quenching as a function of the chemical composition of the steel, workpiece dimensions, quenching procedure and final tempering temperature. The nomograph provides an immediate indication of the residual austenite content in different parts of a quenched workpiece and permits quantification of the various factors affecting this content. Author

N84-17350*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PRELIMINARY STUDY OF THERMOMECHANICAL FATIGUE OF POLYCRYSTALLINE MAR-M 200
Robert C. Bill (USAAVSCOM Research and Technology Labs.), Michael J. Verrilli (Northwestern Univ.), Michael A. McGaw, and Gary R. Halford Feb. 1984 17 p refs
(NASA-TP-2280; E-1795; NAS 1.60:2280; AVSCOM-TR-83-C-6) Avail: NTIS HC A02/MF A01 CSCL 11F

Thermomechanical fatigue (TMF) experiments were conducted on polycrystalline MAR-M 200 over a cyclic temperature range of 500 to 1000 C. Inelastic strain ranges of 0.03 to 0.2 percent were imposed on the specimens. The TMF lives were found to be significantly shorter than isothermal low-cycle-fatigue (LCF) life at the maximum cycle temperature, and in-phase cycling was more damaging than out-of-phase cycling. Extensive crack tip oxidation appeared to play a role in promoting the severity of in-phase cycling. Carbide particle - matrix interface cracking was also observed after in-phase TMF cycling. The applicability of various life prediction models to the TMF results obtained was assessed. It was concluded that current life prediction models based on isothermal data as input must be modified to be applicable to the TMF results. M.G.

N84-17351*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
METALLIC GLASS AS A TEMPERATURE SENSOR DURING ION PLATING
Kazuhisa Miyoshi, Talivaldis Spalvins, and Donald H. Buckley 1984 12 p refs Presented at the 11th Intern. Conf. on Metallurgical Coatings, San Diego, Calif., 9-13 Apr. 1984
(NASA-TM-83566; E-1938; NAS 1.15:83566) Avail: NTIS HC A02/MF A01 CSCL 11F

The temperature of the interface and/or a superficial layer of a substrate during ion plating was investigated using a metallic glass of the composition Fe67Co18B14Si1 as the substrate and as the temperature sensor. Transmission electron microscopy and diffraction studies determined the microstructure of the ion-plated gold film and the substrate. Results indicate that crystallization occurs not only in the film, but also in the substrate. The grain size of crystals formed during ion plating was 6 to 60 nm in the gold film and 8 to 100 nm in the substrate at a depth of 10 to 15 micrometers from the ion-plated interface. The temperature rise of the substrate during ion plating was approximately 500 C. Discontinuous changes in metallurgical microstructure, and physical, chemical, and mechanical properties during the amorphous to crystalline transition in metallic glasses make metallic glasses extremely useful materials for temperature sensor applications in coating processes. A.R.H.

N84-17352*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRIBOLOGICAL CHARACTERISTICS OF GOLD FILMS DEPOSITED ON METALS BY ION PLATING AND VAPOR DEPOSITION
Kazuhisa Miyoshi, Talivaldis Spalvins, and Donald H. Buckley 1984 20 p refs Presented at the 3rd Intern. Conf. on Solid Lubrication, Denver, 5-9 Aug. 1984
(NASA-TM-83572; E-1877; NAS 1.15:83572) Avail: NTIS HC A02/MF A01 CSCL 11F

The graded interface between an ion-plated film and a substrate is discussed as well as the friction and wear properties of ion-plated gold. X-ray photoelectron spectroscopy (XPS) depth profiling and microhardness depth profiling were used to investigate the interface. The friction and wear properties of ion-plated and vapor-deposited gold films were studied both in an ultra high vacuum system to maximize adhesion and in oil to minimize adhesion. The results indicate that the solubility of gold on the substrate material controls the depth of the graded interface. Thermal diffusion and chemical diffusion mechanisms are thought to be involved in the formation of the gold-nickel interface. In iron-gold graded interfaces the gold was primarily dispersed in the iron and thus formed a physically bonded interface. The hardness of the gold film was influenced by its depth and was also related to the composition gradient between the gold and

the substrate. The graded nickel-gold interface exhibited the highest hardness because of an alloy hardening effect. The effects of film thickness on adhesion and friction were established. S.L.

N84-17353*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FACTORS WHICH INFLUENCE DIRECTIONAL COARSENING OF GAMMA PRIME DURING CREEP IN NICKEL-BASE SUPERALLOY SINGLE CRYSTALS
Rebecca A. MacKay and Lynn J. Ebert (Case Western Reserve Univ.) 1984 12 p refs Proposed for presentation at the 5th Intern. Symp. on Superalloys, Seven Springs, Pa., 7-11 Oct. 1984; sponsored by American Inst. of Mining, Metallurgical and Petroleum Engineers
(Grant NsG-3246)
(NASA-TM-83595; E-1997; NAS 1.15:83595) Avail: NTIS HC A02/MF A01 CSCL 11F

Changes in the morphology of the gamma prime precipitate were examined as a function of time during creep at 982 C in [001] oriented single crystals of a Ni-Al-Mo-Ta superalloy. In this alloy, which has a large negative misfit of -0.80 pct., the gamma prime particles link together during creep to form platelets, or rafts, which are aligned with their broad faces perpendicular to the applied tensile axis. The effects of initial microstructure and alloy composition of raft development and creep properties were investigated. Directional coarsening of gamma prime begins during primary creep and continues well after the onset of second state creep. The thickness of the rafts remains constant up through the onset of tertiary creep a clear indication of the stability of the finely-spaced gamma/gamma prime lamellar structure. The thickness of the rafts which formed was equal to the initial gamma prime size which was present prior to testing. The single crystals with the finest gamma prime size exhibited the longest creep lives, because the resultant rafted structure had a larger number of gamma/gamma prime interfaces per unit volume of material. Reducing the Mo content by only 0.73 wt. pct. increased the creep life by a factor of three, because the precipitation of a third phase was eliminated. Author

N84-17354*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INFLUENCE OF COMPOSITION ON THE MICROSTRUCTURE AND MECHANICAL PROPERTIES OF A NICKEL-BASE SUPERALLOY SINGLE CRYSTAL
Michael V. Nathal and Lynn J. Ebert (Case Western Reserve Univ.) 1984 11 p refs Proposed for presentation at the 5th Intern. Symp. on Superalloys, Seven Springs, Pa., 7-11 Oct. 1984; sponsored by American Inst. of Mining, Metallurgical and Petroleum Engineers
(NASA-TM-83563; E-1942; NAS 1.15:83563) Avail: NTIS HC A02/MF A01 CSCL 11F

The effects of cobalt, tantalum, and tungsten contents on the microstructure and mechanical properties of single crystal Mar-M247 were investigated. Elevated temperature tensile and creep-rupture properties of [001] oriented single crystals were related to microstructural features of the alloys. Substitution of Ni for Co in the high refractory metal alloys increased the lattice mismatch, which was considered to be the cause of the increases in tensile and creep strength. Substitution of Ni for Ta caused large decreases in tensile strength and creep life, consistent with decreases in gamma prime volume fraction, lattice mismatch, and solid solution hardening. Substitution of W for Ta resulted in decreased life at high stresses, which was related to small decreases in mismatch and volume fraction. However, the W substitution resulted in improved life at low stresses, which was related to solid solution strengthening by W. Author

N84-17355*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INFLUENCE OF COBALT, TANTAUM AND TUNGSTEN ON THE HIGH TEMPERATURE MECHANICAL PROPERTIES OF SINGLE CRYSTAL NICKEL-BASE SUPERALLOYS Ph.D. Thesis - Case Western Reserve Univ.
Michael V. Nathal Jan. 1984 219 p refs
(NASA-TM-83479; E-1796; NAS 1.15:83479) Avail: NTIS HC A10/MF A01 CSCL 11F

For alloys with the baseline refractory metal level of 3 percent Ta and 10 percent W, decreases in Co level from 10 to 0 percent resulted in increased tensile strength and creep resistance. Substitution of W for Ta resulted in decreased creep life at high stresses but improved life at low stresses. Substitution of Ni for Ta caused large reductions in tensile strength and creep resistance, and corresponding increases in ductility. For these alloys with low Ta plus W totals, strength was independent of Co level. The increases in tensile strength with increases in refractory metal content were related to the increases in gamma volume fraction and solid solution hardening. Increases in strength as Co level decreased were considered to be the result of coherency strain hardening from the increased lattice mismatch. Dislocation shear through the gamma-gamma interface is considered to be the rate limiting step in the deformation process. A.R.H.

N84-17356# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
ALUMINUM-MANGANESE PLATING FROM A MOLTEN SALT BATH Final Report
E. J. Jankowsky 15 Aug. 1983 21 p
(F61-542)
(AD-A135240; NADC-83127-60) Avail: NTIS HC A02/MF A01 CSCL 11/6

The report describes the scale-up of a molten salt bath for electroplating aluminum-manganese alloy coatings. Results of hydrogen embrittlement, adhesion, fatigue and corrosion tests of aluminum-manganese on steel are given. Author (GRA)

N84-17357# Brown Univ., Providence, R. I. Dept. of Chemistry.
HOMOGENEITY AND MAGNETIC SUSCEPTIBILITY IN SOME SUBSTITUTED CADMIUM SPINELS
M. Tellefsen, L. Carreiro, R. Kershaw, K. Dwight, and A. Wold 25 Nov. 1983 18 p
(Contract N00014-77-C-0387)
(AD-A135297) Avail: NTIS HC A02/MF A01 CSCL 11/6

The normal spinels CdFe2O4, CdGa1.8FeO.2O4 and CdRh1.8FeO.2O4 were prepared, and their magnetic susceptibilities were measured. The low micro eff value of 4.72 (5) micro B found for CdFe2O4 can be attributed to hybridization of the 6S and 4G wavefunctions resulting from spin-orbit interaction coupled with strong crystal fields having trigonal components at the spinal B-sites. Magnetic crystal fields having trigonal components at the spinel B-sites. Magnetic susceptibility was sensitive to the homogeneity of samples of CdGa1.8FeO.2O4 and CdRh1.8FeO.2O4, which was dependent upon the method of preparation. For homogeneous samples, the magnetic susceptibility approaches the theoretical value for high-spin Fe3+(3d5). The slight remaining discrepency from spin-only moment is due to the statistical existence of a few small Fe3+ clusters. GRA

N84-17358# Wisconsin Univ., Madison.
STUDIES OF SILICON REFRACTORY METAL INTERFACES: PHOTOEMISSION STUDY OF INTERFACE FORMATION AND COMPOUND NUCLEATION Final Report, 15 Jul. 1981 - 14 Apr. 1983
J. H. Weaver 8 Sep. 1983 44 p
(Contract DAAG29-81-K-0140)
(AD-A135340; ARO-18239.5-PH) Avail: NTIS HC A03/MF A01 CSCL 11/6

Examined are the electronic and morphological interactions which occur at the interface between silicon and a variety of metals, including Cr, Ti, Sm, Au, and Ca. These interface studies were supported by extensive synchrotron radiation photoemission studies of bulk silicides, including Ti2Si5, TiSi2, VSi2, NbSi2, CrSi2, MoSi2, TaSi2, FeSi2, CoSi2, Ni2Si, NiSi, NiSi2, and Pd2Si and by calculations of the density of states of silicides. Identified are the important parameters in the formation of the metal-silicon bond. Demonstrated is the systematic development of the Si-metal p-d hybridization and the reduction of the Si sp3 bond. GRA

N84-17359# Aerospace Corp., El Segundo, Calif. Materials Sciences Lab.
A TECHNIQUE FOR THE NONDESTRUCTIVE DETECTION OF VOIDS AND COMPOSITION ANOMALIES IN METAL MATRIX COMPOSITE WIRES USING X OR GAMMA RAYS
E. P. Muntz, C. Sve, and G. F. Hawkins 31 Aug. 1983 43 p
(Contract F04701-82-C-0083)
(AD-A135481; TR-0083(3726-02)-1; SD-TR-83-65) Avail: NTIS HC A03/MF A01 CSCL 11/6

A method proposed for the nondestructive testing of method matrix composite wires is studied theoretically and experimentally. X or gamma are used to detect the void fraction in these wires by immersing the wires in a bath which has the same linear attenuation coefficient as the matrix material for the X-ray spectrum that is being used. It is concluded that the proposed technique can be expected to detect void fractions of the order of 1% in aluminum matrix, graphite fiber composite wires at a practical linear wire speed. GRA

N84-17360# Rochester Univ., N. Y. Dept. of Chemistry.
SYNTHESIS AND CHARACTERIZATION OF BINUCLEAR SCHIFF BASE COMPLEXES OF NICKEL, COPPER, AND MANGANESE Interim Technical Report
Bryan C. Whitmore and Richard Eisenberg 4 Nov. 1983 13 p
(Contract N00014-83-K-0154; NR Proj. 634-742)
(AD-A135493; UR/DC-83-TR-1; ITR-1) Avail: NTIS HC A02/MF A01 CSCL 07/2

Binuclear complexes of Ni, Cu and Mn have been synthesized and characterized. The reaction of bis(salicylaldehyde) complexes of nickel(II) and copper(II) with m-xylylenebis-(2-(1,3-propanediamine)) (3) result in the formation of 5 and 7 respectively, while the reaction of managanese(II) acetate with salicylaldehyde and 3 results in the formation of 6a. The nickel complex, 5, undergoes a quasireversible two-electron transfer at -1.47 V vs SCE attributable to the nickel(II)-nickel(I) couple. The binuclear nickel(I) complex can be generated from 5 both electrochemically and chemically, and has been shown by infrared analysis to form adducts of CO and MeNC. Magnetic susceptibility measurements by the Faraday method show the manganese and copper complexes (6a and 7) have solid state room temperature moments of 5.47 and 1.92 B.M. per metal center, respectively, while the solution magnetic moment of the binuclear copper complex (7) is found by the Evans method to be 1.49 B.M. per copper center. This reduced magnetic moment relative to the moment for mononuclear Cusalprn(1.79 B.M) suggests a weak magnetic interaction between the two copper centers in the binuclear copper complex 7. GRA

N84-17361# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CONSTITUTION DIAGRAM OF SYSTEM VANADIUM - COPPER
Ye. M. Savitskiy, V. V. Baron, U. K. Duysemaliyev, and Yu. V. Yefimov 17 Nov. 1983 14 p Transl. into ENGLISH from Vestn. Akad. Nauk Kaz. SSR (USSR), v. 20, no. 7, 1964 p 38-44
(AD-A135516; FTD-ID(RS)T-1258-83) Avail: NTIS HC A02/MF A01 CSCL 11/6

The complete constitution diagram of the vanadium-copper system is constructed. Microscopy, thermal and X-ray analyses were used to study the phase equilibrium of the system. The macro- and microscopic analysis revealed demixing of the cast alloys containing from 13.65 to 96.0 at. % Cu into two layers: alpha - a vanadium rich layer, and beta - a copper rich layer. The constitution diagram was contracted from the data of the microstructural, thermal and X-ray analysis and other studies of the hardness, microhardness, and electrical resistance of alloys. J.M.S.

N84-17362# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AN EVALUATION OF OVERLOAD RETARDATION BEHAVIOR AND OVERLOAD RETARDATION MODELS OF TI-6AL-4V SHEET TITANIUM ALLOY
G. Mingda, Z. Yongkui, and Y. Minggao 17 Nov. 1983 19 p Transl. into ENGLISH from Hangkong Cailiao Yanjiusuo (China), v. 1, no. 2, 13 Dec. 1981 p 27-34
(AD-A135548; FTD-ID(RS)T-1577-83) Avail: NTIS HC A02/MF A01 CSCL 11/6

Research on overload retardation behavior under different overload ratios and different crack lengths through overload tests of Ti-6 Al-4V titanium aloys is discussed. Also discussed are the effects of some major factors for retardation behavior. Retardation behavior is considered to be the result of cyclic loads. An attempt is made to establish theoretical or empirical overload retardation models in order to provide an effective method to calculate the fatigue crack growth life under varying amplitudes. R.J.F.

N84-17363# National Bureau of Standards, Washington, D.C. Inorganic Materials Div.
PASSIVE FILMS, SURFACE STRUCTURE AND STRESS CORROSION AND CREVICE CORROSION SUSCEPTIBILITY Final Report, Oct. 1982 - Sep. 1983
Jerome Kruger, J. J. Ritter, Gabrielle G. Long, Masao Kuriyama (State Univ. of New York, Stony Brook), and Alan I. Goldman Nov. 1983 48 p Submitted for publication
(Contract NAONR-18-69)
(AD-A135549; NBSIR-83-2790) Avail: NTIS HC A03/MF A01 CSCL 11/6

Iron K-absorption edge spectra were obtained from the passive films on iron for the dried films in air (ex situ) and for the films in the passivating solutions (in situ). The ex situ results demonstrate that, while the structures of the films are more disordered than the spinel-like iron oxides (e.g. lambda-Fe2O3), they are nevertheless closely related to these crystalline oxides. The in situ data shows evidence of a quite different structure, which may be due to the accommodation of hydrogen containing species into the structure. Author (GRA)

N84-17364# Pennsylvania State Univ., University Park. Dept. of Materials Science and Engineering.
THE EFFECT OF GAS BUBBLES AND CAVITY DIMENSIONS ON THE LOCAL ELECTRODE POTENTIAL WITHIN PITS, CREVICES AND CRACKS
H. W. Pickering 7 Nov. 1983 23 p
(Contract N00014-81-K-0025)
(AD-A134729; AD-E301230) Avail: NTIS HC A02/MF A01 CSCL 11/6

Gas bubbles have been reported to routinely accumulate in cavities during anodic or cathodic polarization in several metals and alloys (Fe, Ni, Cu, Al, stainless steel). These in-place gas bubbles have been found to sharply increase the gradients of potential and ionic concentration within the cavities. A limiting electrode potential, E sub (LIM), in the cavity has been observed, consistant with theoretical considerations which predict its existence. Mathematical modeling has been reasonably successful, especially in the case of cathodic polarization where the calculation shows that the potential and concentration gradients are strong functions of the sharpness of the crack, the ohmic voltage increasing as the crack opening decreases, in agreement with earlier calculations of current distribution in slots by Wagner. By analogy, a similar result is expected for anodic polarization. The shift of the potential with increasing distance into a cavity is always in the direction of a decrease in anodic or cathodic polarization, is typically very large approaching the E sub (LIM) value of the system, is largely independent of the cathodic or anodic polarization applied to the external surface and often places that base of the cavity in a potential regime of other reactions, e.g., anodic metal dissolution at the crack tip while the sample's outer surface is under effective cathodic protection. GRA

N84-17365# Rensselaer Polytechnic Inst., Troy, N. Y. School of Engineering.
TEMPERING KINETICS OF ALLOY STEELS AS A FUNCTION OF QUENCH RATE AND M SUB S TEMPERATURE
D. G. Hennessy, V. Sharma, and G. S. Ansell Jun. 1983 8 p Repr. from Met. Trans. A, v. 14A, Jun. 1983 p 1013-1019
(Contract N00014-76-C-0458; NR Proj. 031-689)
(AD-A134806; TR-14) Avail: NTIS HC A02/MF A01 CSCL 11/6

The effect of quench rate on the as-quenched hardness and carbide or carbon segregate particle size was studied for two alloy steels with M sub s temperatures of 310 C and 300 C. The quench rate was varied from 681 to 93,000 C per second. The hardness was studied using the Vickers hardness technique and the particle size was measured using the high-resolution, small-angle X-ray scattering technique. The as-quenched hardness and particle size were both found to decrease as the quench rate increased. Analysis of the data ruled out autotempering of the martensite as a likely basis for the observed quench rate effects. The effects of aging at room temperature (20 C) on the hardness and particle size for these alloys were also studied. The hardness and particle size were both found to increase as the aging time increased. After 24 hours of aging, the effect of quench rate disappeared in that the hardness and particle size attained were each essentially independent of quench rate. M.G.

N84-17366# Rensselaer Polytechnic Inst., Troy, N. Y. School of Engineering.

ON THE EFFECT OF FINE GRAIN SIZE ON THE M SUB S TEMPERATURE IN Fe-27Ni-0.025C ALLOYS

P. J. Brofman (IBM, Hopewell Junction, N.Y.) and G. S. Ansell Sep. 1983 6 p

(Contract N00014-76-C-0458; NR Proj. 031-689)

(AD-A134807; TR-15) Avail: NTIS HC A02/MF A01 CSCL 11/6

By use of a mechanical alloying technique, a series of Fe-27Ni-0.025C alloys was fabricated with incremental additions of an inert oxide dispersion (Y2O3). By holding matrix chemistry constant, it was possible to evaluate the effect of grain size and yttria dispersion strengthening on the M sub s temperature of these alloys. M.G.

N84-17367# Purdue Univ., Lafayette, Ind. Dept. of Materials Engineering.

PRECIPITATION MECHANISMS IN ALUMINUM-LITHIUM ALLOYS Final Report

T. H. Sanders, Jr. Sep. 1983 236 p

(Contract N00019-81-C-0471)

(AD-A134836; Rept-0303-53-1289) Avail: NTIS HC A11/MF A01 CSCL 11/6

Coarsening kinetics of delta prime in Al-Li and Al-Li-Ag alloys were studied. The influence of deformation on the growth of delta prime was also investigated. GRA

N84-17368# Hanford Engineering Development Lab., Richland, Wash.

CORRELATION OF YIELD STRESS CHANGES IN 316 STAINLESS STEEL IRRADIATED WITH HIGH-ENERGY AND FISSION NEUTRONS

H. L. Heinisch and R. L. Simons Aug. 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19-22 Sep. 1983

(Contract DE-AC06-76FF-02170)

(DE84-002115; HEDL-SA-2912-FP; CONF-830942-58) Avail: NTIS HC A02/MF A01

Data on change in yield strength of SA 316 stainless steel irradiated with 14-MeV, Be(d,n) and fission reactor neutrons which do not correlate with damage energy are examined. A possible temperature or additional spectral effects are suggested. It is found that function, based on the production of lobes in computer simulated cascades, correlates the data much better than damage energy. DOE

N84-17369*# California Inst. of Tech., Pasadena. Seismological Lab.

SHOCK COMPACTION OF MOLYBDENUM POWDER

Thomas J. Ahrens, D. Kostka, T. Vreeland, Jr., R. B. Schwarz (Argonne National Lab., Ill.), and P. Kasiraj Sep. 1983 5 p refs Presented at the Am. Phys. Soc. Meeting on Shock Waves in Condensed Media, Santa Fe, N. Mex., 18 Jul. 1983

(Contracts NASw-3752; W-31-109-eng-38)

(NASA-CR-173154; NAS 1.26:173154; DE84-003713; CONF-830719-58) Avail: NTIS HC A02/MF A01 CSCL 11F

Shock recovery experiments which were carried out in the 9 to 12 GPa range on 1.4 distension Mo and appear adequate to compact to full density (< 45 (SIGMA)m) powders were examined. The stress levels, however, are below those calculated to be from 100 to approx. 22 GPa which a frictional heating model predicts are required to consolidate approx. 10 to 50 (SIGMA)m particles. The model predicts that powders that have a distension of m=1.6 shock pressures of 14 to 72 GPa are required to consolidate Mo powders in the 50 to 10 (SIGMA)m range. DOE

N84-17370# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

IMPROVED SWELLING RESISTANCE FOR PCA AUSTENITIC STAINLESS STEEL UNDER HFIR IRRADIATION THROUGH MICROSTRUCTURAL CONTROL

P. J. Maziasz and D. N. Braski 1983 7 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983

(Contract W-7405-eng-26)

(DE84-003203; CONF-830942-65) Avail: NTIS HC A02/MF A01

Six microstructural variants of Prime Candidate Alloy (PCA) were evaluated for swelling resistance during HFIR irradiation, together with several heats of type 316 stainless steel (316). Swelling was negligible in all the steels at 3000C after approx. 44 dpa. At 500C to 6000C, 25%-cold worked PCA showed better void swelling resistance than type 316 at approx. 44 dpa. There was less swelling variability among alloys at 4000C, but again 25%-cold worked PCA was the best. Microstructurally, swelling resistance correlated with development of fine, stable bubbles whereas high swelling was due to coarser distributions of bubbles becoming unstable and converting to voids (bias-driven cavities). DOE

N84-17371# Sandia Labs., Albuquerque, N. Mex.

FRICTION AND WEAR REDUCTION OF 440C STAINLESS STEEL BY ION IMPLANTATION

L. E. Pope, F. G. Yost, D. M. Follstaedt, S. T. Picraux, and J. A. Knapp 1983 8 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 14 Nov. 1983

(Contract DE-AC04-76DP-00789)

(DE84-003255; SAND-83-1423C; CONF-831174-30) Avail: NTIS HC A02/MF A01

Friction and wear tests on ion-implanted 440C stainless steel discs have been extended to high Hertzian stresses (less than or equal to 3150 MPa). Implantation of 2 x 10(15) Ti/mm(2) (180 to 90 keV) and 2 x 10(15) C/mm(2) (30 keV) into 440C reduces friction (approx. 40%) and wear < 80%) for Hertzian stresses as large as 2900 MPa, stresses which significantly exceed the yield strength of 440C (approx. 1840 MPa). Implantation of 4 x 10(15) N/mm(2) (50 keV) into 440C reduces friction slightly (approx. 25%) for Hertzian stresses > 1840 MPa but provides little or no reduction in wear. The amount of Ti remaining in the wear tracks correlates with the reductions in friction and wear. The implantation of Ti and C produces an amorphous surface layer which is believed to reduce friction and wear, whereas N implantation is expected to produce hard nitride particles which probably do not modify the hardness of 440C (KHN = 789) significantly. DOE

N84-17372# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

DEVELOPMENT OF MODIFIED 9 Cr-1 Mo STEEL FOR ELEVATED-TEMPERATURE SERVICE

Vinod K. Sikka 1983 11 p refs Presented at the TMS/AIME Topical Conf. on Ferritic Alloys for Use in Nucl. Energy Technol., Snowbird, Utah, 19 Jun. 1983

(Contract W-7405-eng-26)

(DE84-003161; CONF-830659-16) Avail: NTIS HC A02/MF A01

The status of development and commercialization of a modified 9 Cr-1 Mo alloy is presented. The alloy is recommended for use in the normalized and tempered condition. Heat treatment, Charpy impact, tensile, and creep properties of the alloy are described.

The modified alloy has creep strength that exceeds that of standard 9 Cr-1 Mo and 2 1/4 Cr-1 Mo steels for the temperature range from 427 to 7040 C. The total elongation and reduction of area values for all test temperatures and rupture times up to 22,500 h exceed 15 and 70%, respectively. The estimated design allowable stresses for this alloy are higher than those for standard 9 Cr-1 Mo and 2 1/4 Cr-1 Mo steel. At 5500 C and above, these values are twice those of the other alloys. DOE

N84-17373# Argonne National Lab., Ill. Chemistry Div.
MODIFICATION OF ALLOY SURFACE COMPOSITION BY SEGREGATION PROCESSES AS A MEANS OF IMPURITY CONTROL IN FUSION DEVICES
A. R. Krauss, D. M. Gruen, and A. B. DeWald (Georgia Inst. of Tech., Atlanta) 1983 17 p refs Presented at the Symp. on Energy Removal and Particle Control and Toroidal Fusion Devices, Princeton, N.J., 26-29 Jul. 1983
(Contract W-31-109-eng-38)
(DE84-003645; CONF-830795-4) Avail: NTIS HC A02/MF A01

The use of surface segregation in alloys as a means of producing low Z coatings which are self-sustaining in a reactor environment present no thermal barrier to the substrate, and avoid mechanical problems associated with the interface region are investigated. Several candidate materials have emerged from calculations, including alloys of copper, vanadium and tungsten. The segregation calculations, light and heavy ion sputtering properties and thermodynamic properties of these materials are presented. Calculations indicate that as little as one atomic layer of low Z material significantly reduces the substrate erosion for both light and heavy ion sputtering. Experimental data on the degree of surface segregation and the rate at which the low Z component migrates to the surface are presented using dilute alloys of lithium in copper as a reference system. The long term stability of the overlayer is limited primarily by the rate at which radiation-enhanced diffusion can replace the eroded surface material. The radiation-enhanced process proceeds much more quickly than the purely thermodynamic process and depends on the damage profile, which in turn depends on the mass and energy spectrum of the incident radiation. DOE

N84-17374# Japan Atomic Energy Research Inst., Tokai.
EFFECTS OF PULSED AND/OR DUAL ION IRRADIATION ON MICROSTRUCTURAL EVOLUTION IN A TI AND SI MODIFIED AUSTENITIC ALLOY
A. Hishinuma, N. H. Packan (ORNL, Tenn.), E. H. Lee (ORNL, Tenn.), and L. K. Mansur (ORNL, Tenn.) 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-7405-eng-26)
(DE84-003411; CONF-830942-67) Avail: NTIS HC A02/MF A01

The influence of pulsed 4 MeV Ni-ion bombardment, with and without simultaneous helium injection, at 958 K and damage levels from 1 to 50 dpa was studied in a low swelling, Ti- and Si- modified austenitic stainless steel. Compared to continuous irradiation, pulsing caused an increase in the number density of interstitial loops formed during irradiation. Helium also increased the nucleation of interstitial loops. The main precipitates formed were a large number of small TiC particles uniformly distributed in the matrix, and a small number of relatively large eta and G precipitates. These course precipitates were somewhat larger in the pulsed specimens. Pulsing appeared to produce no significant change in swelling compared to continuous irradiation. However, for one specimen irradiated to 54 dpa, pulsing concurrent with substantial temperature fluctuations caused by beam heating may have been responsible for a larger swelling compared to continuous irradiation. DOE

N84-17375# Argonne National Lab., Ill. Materials Science and Technology Div.
SEGREGATION OF Zn SOLUTES TO HIGH-ANGLES (001) TWIST GRAIN BOUNDARIES IN Al
D. Wolf and N. Q. Lam 1983 9 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 14-17 Nov. 1983
(Contract W-31-109-eng-38)
(DE84-003455; CONF-831174-44) Avail: NTIS HC A02/MF A01

The energies of the (UC OMEGA) = 5, 13, and 17 (001) coincident-site lattice twist boundaries in Al containing small amounts of Zn solutes were calculated using an iterative energy minimization technique in conjunction with interatomic potentials derived entirely from first principles. By determining both the energies of substitution in the bulk and in different sites in the boundary, the site selectivity for Zn segregation at the grain boundary was investigated. In the lattice plane immediately near the grain boundary, Zn solutes were found to prefer the lower-symmetry noncoincidence sites while, in the next plane, substitution in the coincidence sites is preferred. The effect of Zn-Zn interactions was also considered for small solute concentrations. It is found that the magnitude of the Zn-An interaction energy is remarkably insensitive to the particular sites occupied by the Zn atoms as well as the detailed geometry of the interface. DOE

N84-17376# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
TEMPERATURE ASPECTS OF PULSED ION BOMBARDMENT IN AN AUSTENITIC ALLOY
N. H. Packan 1983 7 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-7405-eng-26)
(DE84-003382; CONF-830942-63) Avail: NTIS HC A02/MF A01

The influence of pulsed ion irradiation to a damage level of 10 dpa at temperatures from 843 to 10230 K was studied in a quanternary Fe-17Cr-17Ni-2.5Mo austenitic alloy. Pulsing periods of either 60 s on/60 s off or 1 s on/1 s off were used, together with continuous bombardment as a control. Helium (200 appM) was supplied either by simultaneous or room temperature preimplantation, or omitted. While most specimens experienced only 2 to 30 K temperature fluctuations with the beam pulses, certain specimens were deliberately allowed to undergo 15 to 500 K variations. Pulse irradiation effects were found to range from little effect at 8450 K, through a notable modification in the relationship between helium and cavity parameters at 9380 K (near the peak swelling temperature), to a substantial reduction of swelling at 10240 K. The influence of the simultaneous temperature excursions compared with constant-temperature pulsed ion bombardment (mostly compared at 8430 K) was small. These results are interpreted in terms of the effects of pulsing and helium on the stability of cavities at high temperatures through the critical size and number of atoms needed for a small cavity to begin bias-driven void growth. DOE

N84-17377# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
EFFECT OF SPECIMEN SIZE AND NICKEL CONTENT ON THE IMPACT PROPERTIES OF 12 Cr-1 MoVW FERRITIC STEEL
W. R. Corwin, R. L. Klueh, and J. M. Vitek 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19 Sep. 1983
(Contract W-7405-eng-26)
(DE84-003270; CONF-830942-62) Avail: NTIS HC A02/MF A01

The ferritic steel 12 Cr-1 MoVW is a candidate material for use in the first wall of magnetic fusion reactors. One of the primary concerns of materials in this application is service-induced embrittlement from aging and irradiation. Unirradiated Charpy impact data were developed on three typical heats of 12 Cr-1 MoVW steel and on heats that were modified with nickel and chromium additions for subsequent simulation of helium effects of irradiation. The ductile-to-brittle transition temperature and the upper-shelf energy were reduced by nickel additions. The addition of nickel while simultaneously maintaining a constant net chromium equivalent caused the transition temperature to increase. The use of a subsize specimen is mandated by the small volume and high gamma heating in high-flux research reactors used for very high-fluence irradiation experiments. Therefore, an understanding of the behavior of the subsize specimen is important in predicting corresponding irradiation-induced transition temperature shifts and

upper-shelf drops of full-size Charpy specimens. Data are reported from subsize Charpy impact specimens, and the full- and subsize specimens are compared. The effect of specimen size on the upper-shelf energy of this material is reduced better by volume normalization than by area normalization. DOE

N84-17378# Argonne National Lab., Ill. Materials Science and Technology Div.

EFFECTS OF NOMINAL AND CRACK-TIP STRAIN RATE ON IGSCC SUSCEPTIBILITY IN CERT TESTS

P. S. Maiya and W. J. Shack Sep. 1983 12 p refs Presented at the TMS-AIME Fall Meeting, Philadelphia, 3-6 Oct. 1983 Sponsored in part by the Nuclear Regulatory Commission

(Contract W-31-109-eng-38)

(DE84-004006; CONF-8310205-3) Avail: NTIS HC A02/MF A01

Constant extension rate tests were performed on sensitized Type 316 stainless steel in oxygenated water (8 ppM O2) containing chloride ion impurities (0.5 ppM) over a range of strain rates from 10(+5) to 2 x 10(+7) s(+1). The susceptibility to intergranular Stress Corrosion Cracking (IGSCC) (as quantified by parameters such as crack length at failure) increases with a decrease in strain rate. A model consistent with the observed and postulated crack growth behavior and with a fracture criterion is presented and used to derive power laws that relate the IGSCC susceptibility parameters and strain rate. The predicted strain rate exponents are in agreement with the experimental results of this and other studies. The correlations between IGSCC susceptibility and strain rate is used to predict susceptibility to cracking outside the range of conditions used in the laboratory. In addition, the average crack-tip strain rate in CERT experiments is estimated by use of a J-integral approach. The average crack growth rate is proportional to the square root of the estimated average crack-tip strain rate. The experimentally observed correlation is in good agreement with that deduced from a slip-dissolution model proposed by Ford. DOE

N84-17379# Wisconsin Univ., Madison. Dept. of Nuclear Engineering.

CORRELATION OF FRACTURE TOUGHNESS WITH TENSILE PROPERTIES FOR IRRADIATED 20% COLD-WORKED 316 STAINLESS STEEL

M. L. Hamilton, F. A. Garner, and W. G. Wolfer Aug. 1983 6 p refs Presented at the 3rd Topical Meeting on Fusion Reactor Mater., Albuquerque, N. Mex., 19-22 Sep. 1983 Prepared in cooperation with Hanford Engineering Development Lab., Richland, Wash.

(Contract DE-AC06-76FF-02170)

(DE84-003954; HEDL-SA-2897; CONF-830942-68) Avail: NTIS HC A02/MF A01

A correlation was developed which allows an estimate to be made of the toughness of austenitic alloys using more easily obtained tensile data. Tensile properties measured on 20% cold-worked AISI 316 specimens made from ducts and cladding irradiated in EBR-2 were used to predict values for the plane strain fracture toughness according to a model originally developed by Krafft. Some microstructural examination is required to determine a parameter designated as the process zone size. In contrast to the frequency employed Hahn-Rosenfeld model, this model gives results which agree with recent experimental determinations of toughness performed in the transgranular failure regime. DOE

N84-17380# Argonne National Lab., Ill. Materials Science and Technology Div.

STUDY OF ION BOMBARDMENT-INDUCED SUBSURFACE COMPOSITIONAL MODIFICATIONS IN NI-Cu ALLOYS AT ELEVATED TEMPERATURES BY ION SCATTERING SPECTROSCOPY

N. Q. Lam, H. A. Hoff, H. Wiedersich, and L. E. Rehn Oct. 1983 7 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 14-17 Nov. 1983

(Contract W-31-109-eng-38)

(DE84-003632; CONF-831174-40) Avail: NTIS HC A02/MF A01

Changes in the subsurface composition of Ni-40 at.% Cu alloys during 3-keV Ne(+) bombardment at temperatures between 25 and 700 C were studied by means of ion scattering spectroscopy. Both the time evolution of the composition in the surface atom layer during ion bombardment and subsurface concentration profiles after rapid specimen cooling to room temperature were measured as a function of temperature. Radiation-enhanced diffusion coefficients were derived from the effective altered-layer thicknesses obtained. A comparison of the experimental measurements with theoretical calculations based on a phenomenological model enabled the identification of processes and kinetics responsible for subsurface compositional modifications. DOE

N84-17381# Argonne National Lab., Ill. Materials Science and Technology Div.

AGING DEGRADATION OF CAST STAINLESS STEEL: STATUS AND PROGRAM

O. K. Chopra and G. Ayrault Oct. 1983 19 p refs Presented at the 11th NRC Water Reactor Safety Res. Inform. Meeting, Gaithersburg, Md., 24-28 Oct. 1983 Sponsored in part by the Nuclear Regulatory Commission

(Contract W-31-109-eng-38)

(DE84-004018; CONF-8310143-65) Avail: NTIS HC A02/MF A01

The significance of in-service embrittlement of cast duplex stainless steels under light-water reactor operating conditions was investigated. The existing data are reviewed to determine the critical parameters that control the aging behavior and to define the objectives and scope of the investigation. The test matrices for microstructural studies and mechanical property measurements are presented. The initial experimental effort is focussed on characterizing the microstructure of long term, low temperature aged material. Specimens from three heats of cast CF-8 and CF-8M stainless steel aged for up to 70,000 h at 300, 350, and 400 C were obtained from George Fisher Ltd., of Switzerland. Initial analyses reveal the formation of three different types of precipitates which are not alpha prime. An FCC phase, similar to the M23C6 precipitates, was present in all the long term aged material. DOE

N84-17382# Bendix Corp., Kansas City, Mo.

OVER-AGING OF ALUMINUM ALLOYS Final Report

M. G. Ulitchny Dec. 1983 15 p refs

(Contract DE-AC04-76DP-00613)

(DE84-004927; BDX-613-3001) Avail: NTIS HC A02/MF A01

The effects of short time over aging on the mechanical properties of aluminum alloys 7050-T736, 7075-T6, 9021-T4, and 9052-F were evaluated. Test results show that when subjected to a temperature of 600 F for short periods of time, the 7XXX series alloys lose almost all of the tensile strength they received through heat treatment; alloy 9021-T4 loses less of its strength; and 9052-F loses almost none of its strength. Tensile tests carried out on 7050-T736 and 7075-T6 in both the as-received and stress-relief-annealed conditions have confirmed that the stress relief anneal has little or no effect on tensile strength. DOE

N84-17383# Technische Hochschule, Aachen (West Germany). Inst. fuer Bildsame Formgebung.

THE CHANGE OF THE MECHANICAL PROPERTIES OF STEEL STRIP IN PROCESSING LINES Final Report, Jun. 1982

Reiner Kopp and Walter Hartig Bonn Bundesministerium fuer Forschung und Technologie Aug. 1983 176 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-178; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 34

Behavior of steel strip at bending under tension is reported. The correspondence between the parameters roll diameter, wrap angle, number of passes, tension strip velocity, strip dimensions and qualities was investigated in order to reduce the roll diameter. A strain limit of 0.2% is found. Roll diameter/strip thickness-ratios up to 1/267 do not change the 0.2% strain limit. The use of smaller rolls in strip processing lines is suggested. The required

power for bridle rolls can be determined by calculation of tension losses and residual stresses. Author (ESA)

N84-17384*# National Bureau of Standards, Washington, D.C.
NBS (NATIONAL BUREAU OF STANDARDS): MATERIALS MEASUREMENTS Annual Report, 1 Apr. 1982 - 31 Mar. 1983
J. R. Manning Aug. 1983 135 p refs
(NASA Order H-27954-B)
(NASA-CR-173162; NAS 1.26:173162; PB84-110493; NBSIR-83-2772) Avail: NTIS HC A07/MF A01 CSCL 11F

Work directed toward the measurement of materials properties important to the design and interpretation of space processing experiments and determinations of how the space environment may offer a unique opportunity for performing improved measurements and producing materials with improved properties is reported. Surface tensions and their variations with temperature and impurities; convection during undirectional solidification; and measurement of the high temperature thermophysical properties of tungsten group liquids and solids are discussed and results are summarized. GRA

N84-17385# Bureau of Mines, Washington, D. C.
CHROMIUM
John F. Papp Aug. 1983 25 p
(PB84-100882) Avail: NTIS HC A02/MF A01 CSCL 08I

Chromium has a wide range of uses in the metallurgical, chemical, and refractory industries. It is one of the Nation's most important strategic and critical materials. Chromium use in iron, steel, and nonferrous alloys enhances hardness and resistance to corrosion or oxidation. The use of chromium to produce stainless steel and nonferrous alloys are two of its more important applications. Other applications are in alloy steel, plating of metals, pigments, leather processing, catalysts, and refractories. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N84-17386 British Library Lending Div., Boston Spa (England).
DEPOSITION OF POLYMER FILMS ON METAL BY THE ELECTROLYSIS OF AQUEOUS SOLUTIONS OF VINYL MONOMERS
L. G. Kolzunova and N. Ya. Kovarskij 1983 10 p refs Transl. into ENGLISH from Plast. Massy (Moscow), no. 5, 1974 p 28-30 (BLL-LTS-1200/83-(5828.4F)) Avail: British Library Lending Div., Boston Spa, Engl.

The possibility of obtaining polymer films on metals during electrolysis from water soluble monomers, and of obtaining conditions under which a film is obtained on the cathode with satisfactory physical and mechanical properties was examined. Author

N84-17387# Materials Research Labs., Melbourne (Australia).
CYCLIC VOLTAMMETRY OF POLYSULFIDE (THIOKOL) PREPOLYMERS AND RELATED COMPOUNDS
Waldemar Mazurek Dec. 1983 29 p refs
(MRL-R-911; AR-003-809) Avail: NTIS HC A03/MF A01

The cyclic voltammetry of polysulfide prepolymers and related monomeric sulfur compounds was examined at a gold wire electrode. Electrode processes were assigned to the polysulfide prepolymers on the basis of those occurring in the model compounds. It was shown that the technique may be used in the quantitative determination of sulfur or in the determination of prepolymer content in a commercial formulation. M.G.

N84-17388*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REFRACTORY MATERIALS FOR HIGH-TEMPERATURE THERMOELECTRIC ENERGY CONVERSION
Charles Wood and David Emin (Sandia Labs., Albuquerque, N. Mex.) 1983 8 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 14 Nov. 1983
(Contracts NAS7-100; DE-AC04-76DP-00789)
(NASA-CR-173159; NAS 1.26:173159; DE84-004994; SAND-83-1647C; CONF-831174-46) Avail: NTIS HC A02/MF A01 CSCL 11G

Theoretical work of two decades ago adequately explained the transport behavior and effectively guided the development of thermoelectric materials of high conversion efficiencies of conventional semiconductors (e.g., SiGe alloys). The more significant contributions involved the estimation of optimum doping concentrations, the reduction of thermal conductivity by solid solution doping and the development of a variety of materials with ZT approx. 1 in the temperature range 300 K to 1200 K. ZT approx. 1 is not a theoretical limitation although, experimentally, values in excess of one were not achieved. Work has continued with emphasis on higher temperature energy conversion. A number of promising materials have been discovered in which it appears that ZT $>$ 1 is realizable. These materials are divided into two classes: (1) the rare-earth chalcogenides which behave as itinerant highly-degenerate n-type semiconductors at room-temperature, and (2) the boron-rich borides, which exhibit p-type small-polaronic hopping conductivity. DOE

N84-17389*# Cleveland State Univ., Ohio. Dept. of Chemical Engineering.
CONSOLIDATION OF Si3N4 WITHOUT ADDITIVES (BY HOT ISOSTATIC PRESSING) Final Technical Report
Hun C. Yeh Sep. 1983 73 p refs
(Grant NsG-3155)
(NASA-CR-173279; NAS 1.26:173279) Avail: NTIS HC A04/MF A01 CSCL 11G

The potential of using hot isostatic pressing (HIP'ing) technique to produce dense silicon nitride materials without or with a reduced amount of additives (much less than 5 w/o) was investigated. Hot isostatic pressing technique can provide higher pressure and temperature than hot pressing can, thus has the potential of requiring less densification aids to consolidate Si3N4 materials. It was anticipated that if such dense materials could be fabricated, the high temperature strength of the material should be improved significantly. Observations on the phase transformation, densification behavior, and microstructures of the samples are also documented. Density, microhardness, four point bend strength (room temperature and 1370 C) were measured on selected densified materials. Author

N84-17390# Gulf and Western Applied Science Labs., Waltham, Mass.
ION DEPOSITED CARBON COATINGS Final Report, Feb. 1979 - Feb. 1983
S. Aisenberg and M. Stein Wright-Patterson AFB, Ohio AFWAL Jul. 1983 71 p
(Contract F33615-79-C-5084; AF Proj. ILIR)
(AD-A135068; ASL-TR-1054; AFWAL-TR-83-4080) Avail: NTIS HC A04/MF A01 CSCL 11/3

The overall objective of this program is to demonstrate a system capable of reproducibly coating polycarbonate plastic sheet with ion deposited transparent carbon. The carbon coatings are to be characterized on the plastic sheet for potential use as a durable, abrasion resistant coating for windshield and canopy assemblies. GRA

N84-17391# Florida Univ., Gainesville. Dept. of Materials Science and Engineering.
ULTRASTRUCTURE PROCESSING AND ENVIRONMENTAL STABILITY OF ADVANCED STRUCTURAL AND ELECTRONIC MATERIALS Final Report, 1 Mar. 1980 - 31 Mar. 1983
L. L. Hench Mar. 1983 324 p
(Contract F49620-80-C-0047; AF Proj. 2303)
(AD-A135107; AFOSR-83-0921TR) Avail: NTIS HC A14/MF A01 CSCL 11/2

The goal of this Multi-Investigator Research Program (MIRP) is to achieve an understanding of the science of ultrastructure processing. Ultrastructure processing refers to the manipulation

and control of surfaces and interfaces to attain a new generation of high performance materials with predictable properties and environmental insensitivity. Problem areas that may benefit from the use of ultrastructure processing include: behavior of particulate solids, adhesion of fillers and reinforcers in composites, corrosion of glasses and glass-ceramics, fatigue of brittle materials, grain boundary attack of ceramics, effects of energetic particle beams, lifetime of non-oxide ceramics, electronic behavior of high band gap semiconductors, multiphase electronic components. GRA

N84-17392# Texas Christian Univ., Fort Worth. Dept. of Chemistry.

SYNTHESIS OF PHOSPHORUS-NITROGEN POLYMERS USING Si-N-P REAGENTS

P. Wisian-Neilson, A. K. Roy, Z. M. Xie, and R. H. Neilson 22 Nov. 1983 12 p

(Contract N00014-79-C-0632)

(AD-A135224; TCU/DC/TR-83-04) Avail: NTIS HC A02/MF A01 CSCL 07/3

Many small-molecule Si-N-P compounds of appropriate design can function as precursors to various oligomeric and polymeric P-N systems. For example, poly(dialkylphosphazenes), (R2PN)n, are readily obtained via the thermal condensation-polymerization of certain N-silylphosphinimines, Me3SiN=P(X)R2. In addition, novel 3-coordinate phosphorus-V compounds including the bis (imino)-phosphoranes, RP(=NSiMe3)2, can potentially lead to new polymers of formula (RPN) sub n, the phosphorus analogs of electrically conducting (SN) sub n. The synthesis of poly-phosphazenes and their precursors and the synthesis of potential precursors to (RPN) sub n are discussed. GRA

N84-17393# Dayton Univ., Ohio. Research Inst.

MODEL COMPOUND STUDIES OF RIGID ROD AROMATIC HETEROCYCLIC POLYMER SYSTEMS, THE X-RAY CRYSTAL STRUCTURE OF 2,6-DIPHENYLBENZO (1,2-d; 5,4-d') DI-IMIDAZOLE TETRAHYDRATE, C2OH14N4. 4H2O, A MODEL SYSTEM FOR THE STUDY OF POLYMER-WATER INTERACTION IN POLYBENZIMIDAZOLES Final Report, 1 Aug. 1981 - 30 Sep. 1982

M. Hunsaker, W. W. Adams, and A. V. Fratini Wright-Patterson AFB, Ohio AFWAL Jul. 1983 92 p

(Contract F33615-81-C-5019; AF Proj. 2303)

(AD-A135278; AFWAL-TR-83-4055) Avail: NTIS HC A05/MF A01 CSCL 11/9

The crystal and molecular structure of 2,6-diphenylbenzo (1,2-d;5,4-d') diimidazole tetrahydrate, C2OH14N4. 4H2O, is determined by single crystal X-ray diffraction. The benzodiimidazole compound is used as a model compound for poly(p-phenylenebenzodiimidazole), a rigid rod polymer. The crystals grown from ethanol are well formed, translucent, and amber tinted. The space group is P21/c (monoclinic), with cell constants a = 9.008(2)A, b = 24.967(7)Angstroms, c = 9.870(5)Angstroms, Beta = 119.82(3)deg. There are four molecules per unit cell of volume 1925.8(1.3)A3, and the measured density is 1.295 g/cc. 4850 unique reflections out to 56 deg in 2 theta were collected with an automated diffractometer using niobium filtered MoK alpha, radiation. The 2 theta scan technique was employed. Absorption corrections were made and approximately 11,000 reflections were averaged to give a hemisphere of independent observations. The direct method of phase determination was used to solve the structure, and full matrix least squares refinement gave a final Rw factor of 0.084 based on the 3570 reflections with Fobs > or = 3sigma(F). GRA

N84-17394# Army Materials and Mechanics Research Center, Watertown, Mass.

FLAMMABILITY CHARACTERISTICS OF SOME EPOXY RESINS AND COMPOSITES Final Report

D. P. Macaione, R. P. Dowling, II, and P. R. Bergquist Sep. 1983 22 p

(DA Proj. 1T1-62105-AH-84)

(AD-A135282; AMMRC-TR-83-53) Avail: NTIS HC A02/MF A01 CSCL 11/9

The flammability characteristics of a number of epoxy resin formulations and glass fiber-reinforced epoxy resin composites have been evaluated by thermal analysis, limiting oxygen index/temperature index, flash ignition, and smoke density measurement techniques. Results have indicated that appropriate flame-retardant additives or halogenated monomers should be incorporated into the matrix resin to increase material survivability and reduce resin combustibility. Author (GRA)

N84-17395# Ciba-Geigy Corp., Ardsley, N.Y. Plastics and Additives Div.

DEVELOPMENT OF A STABLE EPOXY RESIN SYSTEM FOR COMPOSITE REPAIR Final Report, 22 Sep. 1981 - 15 Nov. 1982

Jonas Weiss Mar. 1983 24 p

(Contract N62269-81-C-0153; R02204001)

(AD-A135390; NADC-81108-60) Avail: NTIS HC A02/MF A01 CSCL 11/9

Novel latent epoxy hardeners which show promise for the field repair of composite structures of naval aircraft have been developed and tested. Two hardeners, phthalamides of 1,2-diaminocyclohexane (DACP) and of m-xylylenediamine, were latent with multifunctional epoxy resins for 4 to 12 months and yield glass transition temperatures of 145C and 130C respectively, when cured at 150C. Fracture toughness (KIC) of a DACP/MY 720 molding is 2.27 kg/mm 3/2. Slightly higher than that of a standard diaminodiphenyl sulfone (DDS)/MY 720 system. Graphite prepreg was made using DACP/MY 720 and DDS/MY 720 matrix resins, and unidirectional, well-consolidated laminates were prepared at low pressure (100 psi). Short-beam-shear and tensile values for the phthalamide laminate range between 72% and 105% of the values determined for the DDS/MY 720 laminate. Dynamic mechanical analysis shows the Tg of the DACP laminate to be 130C and to decrease by about 90C with 1.1% water absorption on aging at 49C and 95% relative humidity. This hot/wet conditioning reduces shear and tensile properties much more than for the DDS/MY 720 control laminate. GRA

N84-17396# Pennsylvania Univ., Philadelphia. Dept. of Chemistry.

A NEW APPROACH TO POLYMER CHEMISTRY: ORGANOMETALLIC AND BIOACTIVE PHOSPHAZENES Interim Technical Report

H. R. Allcock 5 Dec. 1983 17 p Submitted for publication

(Contract N00014-75-C-0685; NR Proj. 356-577)

(AD-A135429; TR-32) Avail: NTIS HC A02/MF A01 CSCL 07/3

Polyphosphazenes are prepared by a substitutive process that involves nucleophilic displacement reactions on poly (dihalophosphazenes). A variety of strategies are described for the utilization of this approach for the preparation of polymeric drugs and polymer-bound transition metal systems. Author (GRA)

N84-17397# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AN INVESTIGATION OF THE THERMODEGRADATION OF ABLATIVE ORGANIC SILICON RESIN

W. J. Sun 10 Nov. 1983 27 p Transl. into ENGLISH from Binggong Xuebao (China), v. 3, no. 3, Aug. 1981 p 1-10

(AD-A135546; FTD-ID(RS)T-1410-83) Avail: NTIS HC A03/MF A01 CSCL 11/9

The reaction of thermodegradation of the GS-401 ablative organic silicon resin, a material of excellent thermal stability, is discussed. It is shown that the thermodegradation reaction of this kind can be divided into several stages; the apparent activation energy as well as the order of reaction associated with each stage are different from those. Throughout the entire degradation process, the methyl is always more stable than the benzol. R.J.F.

N84-17398# Space Sciences, Inc., Monrovia, Calif.

MASS SPECTROMETRIC DECOMPOSITION STUDIES ON SEVERAL AZIDO AND NITRATO POLYMERS, THERMAL PLASTICIZERS AND NOVEL NITRAMINES Annual Summary Report,

1 Aug. 1982 - 31 Jul. 1983
M. Farber, S. P. Harris, and R. D. Srivastava Sep. 1983 56 p
(Contract N00014-80-C-0711)
(AD-A134636) Avail: NTIS HC A04/MF A01 CSCL 07/4

Effusion mass spectrometric investigation of BAMO, AMMO, AZOX and GAP yielded primary decomposition of N2 release at approximately 120 C and E(a) values of 170 to 180 kJ mol(-1) (43 to 43 kcal mol(-1)). The 50 to 50% copolymer of BAMO-BNMO decomposes initially through the nitrato constituent at approximately 100 C followed by the azide decomposition. The thermal degradation mechanism for BEMO appears to be a stepwise breaking of the ethoxy-methyl bonds followed by the stripping of the methylene groups. BFMO is stable to temperatures greater than 200 C with initial decomposition products of HF, with considerable depolymerization occurring. The major decomposition product of the NSWC novel nitramine, C6H8N8O12, is the eight-membered nitramine ring less two NO2 molecules, molecular weight 292. The decomposition product is stable in the gas phase at 300 C. GRA

N84-17399# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Macromolecular Science.
CRACK PROPAGATION IN POLYSTYRENE UNDER FIXED ELONGATION Interim Technical Report
K. Sehanobish, E. Baer, A. Chudnovsky, and A. Moet 28 Oct. 1983 38 p
(Contract N00014-75-C-0795; NR Proj. 356-554)
(AD-A134749; AD-E000550; CWRU/DMS/TR-14) Avail: NTIS HC A03/MF A01 CSCL 11/9

Microscopic observations of precracked polystyrene samples under fixed elongation conditions reveal that crack propagates discontinuously under diminishing stress to a stable configuration. A zone of intensive crazes in the vicinity of the crack tip evolves currently with crack growth. Fracture occurs as the translation and expansion of the crazed zone ahead of the crack. The phenomenon has been successfully explained using a crack layer model. Contrary to conventional fracture mechanics ideas, crack propagation is found to be controlled by the difference between the energy dissipated in damage (crazing) growth and the relevant energy release rate. Conditions of stability have been determined in terms of the relationship between these energies. GRA

N84-17400# Army Materials and Mechanics Research Center, Watertown, Mass.
CERAMIC LIFE PREDICTION METHODOLOGY - HOT SPIN DISC LIFE PROGRAM Interim Report, 1 Oct. 1979 - 30 Sep. 1982
R. R. Baker, L. R. Swank, and J. C. Caverly Aug. 1983 48 p
(Contract DAAG46-77-C-0028)
(AD-A134783; AMMRC-TR-83-44) Avail: NTIS HC A03/MF A01 CSCL 11/2

A rotating disc was designed to fail due to time dependent mechanisms. Several discs were fabricated and an existing test rig was developed to test the discs at design conditions. Ten discs were tested at steady state under the design conditions of 2300 F rim temperature and 50,000 rpm for periods of 0.20 hours to 25 hours. An experimental failure distribution was obtained for the ten discs and presented as reliability versus time. Three different data bases (double torsion, stress rate, and stress rupture) were used to calculate reliability versus time and the results were compared to the experimental results. It was observed that the best correlation with the experimental results was given by the stress rupture data base. Author (GRA)

N84-17401# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
BEHAVIOR OF AN AROMATIC HETEROCYCLIC POLYMER IN SALT SOLUTION Special Interim Report, Jun. 1972 - Sep. 1973
T. E. Helminiak, T. R. Hanely, and C. L. Benner Aug. 1983 46 p
(AF Proj. 2419)
(AD-A134865; AFWAL-TR-83-4010) Avail: NTIS HC A03/MF A01 CSCL 07/3

The addition of lithium chloride (LiCl) to solutions of poly(5,5'bibenzimidaole-2,2'diyl-1,3 phenylene) (PBI) and N,N dimethyl-acetamide (DMAC) resulted in the expansion of the PBI molecule in solution. This expansion was owing to the association of lithium and/or chloride ions in the region of the nitrogen atoms on the polymer chain. The presence of these ions expanded the polymer chain by means of electrostatic repulsion. This effect was reflected in the results of conductivity and viscosity studies. In general, LiCl can be used for both increased solubility and increased viscosity for this polymer-solvent system. A ratio of 0.125 gram of LiCl per of PBI was determined to be the optimum amount of LiCl to be added. This amount corresponds to one mole of LiCl for every mole of PBI repeat unit. The PBI molecule was determined to have entanglements in concentrated solution at every 27 or 28 molecules along the polymer chain. This length between the entanglements is very low in comparison to other polymers, indicating a strongly interacting system. The chain length between entanglements was approximately the same for both PBI-DMAC and PBI-LiCl-DMAC solutions. GRA

N84-17402# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
POLYMERIC GLAZINGS
Paul Schissel Oct. 1983 8 p refs Presented at the Solar Thermal Res. Workshop, Atlanta, 7-8 Sep. 1983
(Contract DE-AC02-83CH-10093)
(DE84-000016; SERI/TP-255-2091; CONF-830990-2) Avail: NTIS HC A02/MF A01

Polymer coated silver mirrors with reflectances greater than 90% that can approach a lifespan of 5 years were evaluated. Evaluation of silver mirrors was initiated and is continuing, using realtime outdoor screening tests along with accelerated weathering devices. Degradation processes are studied. The experimental approach is multifaceted. Metallized films currently available from industrial sources are tested, commercially available polymeric films are silvered and tested, and polymeric films are formed onto silver films, which are deposited on a glass substrate for testing. It is demonstrated that the dimunition of reflectance using wet processed silver is not a chemical effect. It is found that PMMA is stable in sunlight. DOE

N84-17403# Oak Ridge National Lab., Tenn.
ION BEAM MODIFICATION OF CERAMICS
C. J. McHargue, C. W. White, B. R. Appleton, G. C. Farlow, and J. M. Williams 1983 9 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 14 Nov. 1983
(Contract W-7405-eng-26)
(DE84-003302; CONF-831174-36) Avail: NTIS HC A02/MF A01

Alterations to the structure and properties of ceramics which are complex due to local charge balance is discussed. Ion damage can occur as a result of ionizing effects as well as displacement collisions. Ion species, implantation temperature, implantation energy, and the specific bonding characteristics of the host are important parameters in determining the structure and properties of implanted ceramics. Some of these effects are illustrated for Al2O3 implanted with chromium or zirconium and silicon carbide implanted with chronium. DOE

N84-17404# California Univ., Livermore. Lawrence Livermore Lab.
DYNAMIC CONSOLIDATION OF CERAMIC POWDERS: PRACTICALITIES, PROBLEMS, AND PROSPECTS
W. H. Gourdin 10 Nov. 1983 14 p refs Presented at the Mater. Res. Soc. Symp. on Defect Properties and Processing of High-Technol. Nonmetallic Mater., Boston, 13-17 Nov. 1983
(Contract W-7405-eng-48)
(DE84-003744; UCRL-89333; CONF-831174-41) Avail: NTIS HC A02/MF A01

The potential of shock wave consolidation of ceramic powders as a technique for producing well-bonded, uniform, crack-free monoliths is assessed. Current compaction methods are reviewed and the characteristics of the consolidated material are presented. Because the shock and release histories experienced by powder compacts in simple compaction assemblies are complex, such

simple assemblies are unlikely to yield structurally sound bodies. Exact control of the stress history over the entire loading cycle is difficult to achieve, and becomes increasingly difficult as the peak stresses are increased. The powder must therefore be sufficiently plastic at moderate stresses to permit densification and bonding of the compact without destruction of the compact during release. Not all ceramic powders will satisfy this criterion. Local microstructural modification, including interfacial melting, is limited by the fine particle sizes and large surface areas of many ceramic powders. DOE

N84-17405# Battelle Columbus Labs., Ohio.
TIE MOLECULES IN POLYETHYLENE Annual Report, Apr. 1982 - Mar. 1983
A. Lustiger Aug. 1983 67 p refs Sponsored by Gas Research Inst.
(PB84-101435; GRI-82/0077) Avail: NTIS HC A04/MF A01 CSCL 11I

Slow crack growth brittle-type fracture is the primary mode of material-related failure in polyethylene gas distribution piping. On a molecular level, this type of failure occurs through separation of lamellage in this material under stress. Tie molecules are the links which hold these lamellae together. The objective of this work is to develop an analytical technique to measure tie molecule concentration in polyethylene (PE). Environmental stress cracking was induced in polyethylene pipe and subsequently etched to observe the preferential path for fracture initiation. For analytical measurement of the molecules, three medium density polyethylene resins, identical except for widely varying molecular weights, were used. Author (GRA)

N84-17406# National Bureau of Standards, Washington, D.C.
JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS. VOLUME 88, NUMBER 5, SEPTEMBER-OCTOBER 1983
David T. Goldman, ed. Oct. 1983 76 p refs
(PB84-125293; LC-63-37059) Avail: NTIS HC A05/MF A01 CSCL 11I

Contents: History of atomic clocks; Size and refractive index determination of single polystyrene spheres; The force-elongation curve of a thin fibrous network; and Publications of the National Bureau of Standards. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N84-17407*# United Technologies Research Center, East Hartford, Conn.
AVIATION-FUEL PROPERTY EFFECTS ON COMBUSTION Contractor Final Report
T. J. Rosfjord Feb. 1984 147 p refs
(Contract NAS3-23167)
(NASA-CR-168334; NAS 1.26:168334; UTRC-884-915908-29) Avail: NTIS HC A07/MF A01 CSCL 21D

The fuel chemical property influence on a gas turbine combustor was studied using 25 test fuels. Fuel physical properties were de-emphasized by using fuel injectors which produce highly-atomized, and hence rapidly vaporizing sprays. A substantial fuel spray characterization effort was conducted to allow selection of nozzles which assured that such sprays were achieved for all fuels. The fuels were specified to cover the following wide ranges of chemical properties: hydrogen, 9.1 to 15 (wt) pct; total aromatics, 0 to 100 (vol) pct; and naphthalene, 0 to 30 (vol) pct. standard fuels (e.g., Jet A, JP4), speciality products (e.g., decalin, xylene tower bottoms) and special fuel blends were included. The latter group included six, 4-component blends prepared to achieve parametric variations in fuel hydrogen, total aromatics and naphthalene contents. The principle influences of fuel chemical properties on the combustor behavior were reflected by the radiation, liner temperature, and exhaust smoke number (or equivalently, soot number density) data. Test results indicated that naphthalene content strongly influenced the radiative heat load while parametric variations in total aromatics did not. Author

N84-17408# Materials Research Labs., Melbourne (Australia).
THE MRL SMALL SCALE GAP TEST FOR THE ASSESSMENT OF SHOCK SENSITIVITY OF HIGH EXPLOSIVES
M. G. Wolfson Aug. 1983 28 p refs
(MRL-R-896; AR-003-309) Avail: NTIS HC A03/MF A01

A small scale gap test (SSGT) used for the assessment of shock sensitivity of high explosives is described. Details of the test assembly, procedure and analysis of results, along with results for a range of explosives and explosive compositions are presented. A specially designed explosive firing cell is also described. The SSGT has proved to be a simple, convenient and relatively cheap method for the assessment of shock sensitivity. Results are reproducible and provide a good indication of relative shock sensitivity. S.L

N84-17409# Committee on Science and Technology (U. S. House).
ALTERNATIVE FUELS FOR GENERAL AVIATION
Washington GPO 1983 215 p refs Hearing before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., No. 40, 29 Aug. 1983
(GPO-27-618) Avail: Subcommittee on Transportation, Aviation and Materials

The price and availability of fuel continues to be a major barrier to the free expansion of general aviation. Although this increase in fuel prices had a more severe impact on airlines, it has also slowed the demand for general aviation aircraft. With the sales of general aviation aircraft in a depressed state, the development of alternative fuels such as liquid methane, ethanol, methanol, and automobile gasoline can help spur the industry back to health. Recent flight tests of these alternative fuels are examined. B.G.

N84-17410*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mechanical Engineering.
EMISSION FTIR ANALYSES OF THIN MICROSCOPIC PATCHES OF JET FUEL RESIDUE DEPOSITED ON HEATED METAL SURFACE Interim Report
James L. Lauer and Peter Vogel Jan. 1984 32 p refs
(Grants NAG3-205; DAAG24-83-K-0058; AF-AFOSR-0005-81)
(NASA-CR-168331; NAS 1.26:168331) Avail: NTIS HC A03/MF A01 CSCL 21D

Deposits laid down in patches on metal strips in a high pressure/high temperature fuel system simulator operated with aerated fuel at varying flow rates were analyzed by emission FTIR in terms of functional groups. Significant differences were found in the spectra and amounts of deposits derived from fuels to which small concentrations of oxygen-, nitrogen-, or sulfur-containing heterocyclics or metal naphthenates were added. The spectra of deposits generated on strips by heating fuels and air in a closed container were very different from those of the flowing fluid deposits. One such closed-container dodecane deposit on silver gave a strong surface-enhanced Raman spectrum. Author

N84-17411# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
MEASUREMENTS OF HYPERGOLIC FUELS' AND OXIDANTS' PERMEATION THROUGH COMMERCIAL PROTECTIVE MATERIALS: PART 1. INHIBITED RED FUMING NITRIC ACID AND UNSYMMETRICAL DIMETHYLHYDRAZINE
R. N. Abernathy, R. B. Cohen, and J. J. Shirtz 30 Sep. 1983 36 p
(Contract F04701-82-C-0083)
(AD-A134714; TR-0083(3908)-Pt-1; SD-TR-83-51-Pt-1) Avail: NTIS HC A03/MF A01 CSCL 06/17

Protective equipment is used by Air Force and NASA personnel who participate in hypergolic propellant transfer and

loading operations that entail potential exposure to hypergolic vapor or liquid. Forty materials (sections of protective suits, gloves, boots and a hood window) that are now used or are under consideration for future use in hypergolic propellant transfer operations were tested to determine their resistance to permeation by the fuel, unsymmetrical dimethylhydrazine (HDMH), after exposure to liquid UDMH, and their relative resistance to permeation by nitrogen dioxide (N02) after exposure to the liquid oxidant, inhibited red fuming nitric acid (IRFNA). The material sections were clamped in a static test cell that permitted the fabric to be exposed to the fuel (or oxidant) on one side while UDMH (or NO2) permeation was monitored by an electrochemical analyzer on the other side. The experiments were discontinued after 90 min if no permeation was detected. A new material section was used in each test; the test section was neither preconditioned nor was exposure repeated. Only one suit fabric of the nine resisted both NO2 and UDMH permeation for the full 90 min of the tests. One resisted both NO2 and UDMH permeation for the full 90 min of the tests. One resisted UDMH for 90 min and was permeated rapidly (in 2 min) by NO2, two resisted UDMH and NO2 permeation from 20 to 30 min, and others were permeated in less than 5 min by both propellants. GRA

N84-17412# Mound Lab., Miamisburg, Ohio.
SURFACE COMPATIBILITY STUDIES OF POTASSIUM PERCHLORATE REACTION WITH PYROTECHNIC FUELS
Pu Sen Wang, William E. Moddeman, and Warren C. Bowling 1983 18 p refs Presented at the Joint Symp. on Compatibility of Plastics/Mater. with Explosives, Propellents and Pyrotechnics, Lake Ozark, Mo., 31 Oct. 1983
(Contract DE-AC04-76DP-00053)
(DE84-002829; MLM-3110(OP); CONF-8310159-8) Avail: NTIS HC A02/MF A01

Surface sensitive X-ray photoelectron spectroscopy and X-ray induced Auger electron spectroscopy were used to analyze surface changes in Fe/KClO4, TiHO 65/KclO4 and Al foils in KClO4 during accelerated aging at 60 and 1200 C. The result shows a 0.02% Cl(+) formation per day in Fe/KClO4 and TiHO 65/KClO4 powders aged at 1200C for less than or equal to 145 days. No KClO4 decomposition was observed under the similar aging conditions in KClO4 samples without pyrotechnic fuels. Titanium oxide to KClO4 signal ratio in a pressed disk of TiHO 65/KClO4 was found to be lower than that of the powdered samples. Carbon impurities were noted in all powders, especially strong in metal (or subhydride) containing specimens; carbon impurities were slightly removed from the subhydride during aging. DOE

N84-17413# Mound Lab., Miamisburg, Ohio.
POTASSIUM PERCHLORATE REACTION WITH PYROTECHNIC FUELS
Pu Sen Wang, William E. Moddeman, and Warren C. Bowling 1983 18 p refs Presented at the 11th DOE Ann. Compatibility Meeting, Livermore, Calif., 18 Oct. 1983
(Contract DE-AC04-76DP-00053)
(DE84-002840; MLM-3117-OP; CONF-8310111-9) Avail: NTIS HC A02/MF A01

Surface sensitive X-ray photoelectron spectroscopy and X-ray induced Auger electron spectroscopy were used to analyze surface changes in Fe/KClO4, TiH/sub 0.65//KClO4 and Al foils in KClO4 during accelerated aging at 60 C and 1200 C. The result shows a 0.02% Cl(+) formation per day in Fe/KCl1O4 and TiH/sub 0.65//KVlO4 powders aged at 1200 C for less than or equal to 145 days. No KClO4 decomposition was observed under the similar aging conditions in KClO4 samples without pyrotechnic fuels. Titanium oxide to KClO4 signal ratio in a pressed disk of TiH/sub 0.65//KClO4 was found to be lower than that of the powdered samples. Carbon impurities were noted in all powders, especially strong in metal- (or subhydride-) containing specimens; carbon impurities were slightly removed from the subhydride during aging. DOE

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N84-17414 British Library Lending Div., Boston Spa (England).
INFLUENCE OF VIBRATION GRINDING ON THE PROPERTIES OF TUNGSTEN POWDERS AND THE QUALITY OF SINTERED PIECES
V. I. Kotenev, V. N. Nikolskii, E. M. Rabinovich, V. K. Ushakov, and V. Ya. Koteweva [1983] 8 p refs Transl. into ENGLISH from Stal (USSR), no. 3, 1983 p 75-77
(BLL-M-35373) Avail: British Library Lending Div., Boston Spa, Engl.

It is shown that treatment of low-activity tungsten powder in a vibration mill makes it suitable for obtaining semi-finished products of tungsten and of molybdenum alloy without, or with much less addition of the high-activity powder. Author

N84-17415# British Library Lending Div., Boston Spa (England).
MULTI-TRANSITION STAMPING OF COMPONENTS WITH THIN BODY AND TALL STIFFENING RIBS
I. V. Kostarev and A. O. Kharitonov 1983 6 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 3, 1983 p 77-80
(BLL-M-35384-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A procedure to design the transitions for multitransition stamping of components with tall stiffening ribs and a thin body is proposed. Expressions for determining the resistance of metal to flow in the die cavities beneath a stiffening rib and into the projection groove are used. The procedure is based on the assumption that the reverse process of deformation can be described by the same mathematical apparatus as the direct process. Experimental checking of the developed procedure using a laboratory die confirmed the correctness of the approach to calculation of the grooves of the tool for multitransition stamping. E.A.K.

N84-17416# Council for Scientific and Industrial Research, Pretoria (South Africa). Foreign Language Service.
ASPECTS OF THE GRINDING PROCESS
E. Salje 1983 29 p refs Transl. into ENGLISH from Tech. Mitteilungen (West Germany), v. 67, no. 7/8, 1976 p 331-338
(CSIR-Trans-1694) Avail: NTIS HC A03/MF A01

The fact that the grinding wheel produces a unique image on the workpiece is utilized in a very simple way to obtain reproducible results and information regarding the grinding wheel topography and therefore the grinding action. This method makes it possible to monitor changes that occur in the grinding wheel with time. An equation describing peak-to-valley roughnesses with which the changes occurring in this parameter from the initial state (dressing effect) to the final state is described. Author

N84-17417# Council for Scientific and Industrial Research, Pretoria (South Africa). Foreign Language Service.
THE USE OF DIAMOND CORE SAWS IN THE ELECTRONICS INDUSTRY
W. Hansen 1983 15 p Transl. into ENGLISH from Ind. Diamanten Rundschau (West Germany), v. 9, no. 2, 1975 p 84-89
(CSIR-Trans-1702) Avail: NTIS HC A02/MF A01

In the machining of material for semiconductors the aim is to keep wastage of this valuable material as low as possible. The so-called core saw was accordingly developed, which permits the cutting of very thin and accurately dimensioned wafers with very little wastage. This saw consists of a ring-shaped metal core plate which is coated by electrodeposition on the inside diameter with diamond grit and tensioned like a drum. Different saw blade and machine designs are described and recommendations concerning their use are made. S.L.

N84-17418# Council for Scientific and Industrial Research, Pretoria (South Africa). Foreign Language Service.

WHEEL EFFICIENCY IN THE DIAMOND-SPARK EROSION GRINDING OF TUNGSTEN CARBIDES
M. D. Uzunjan and Ju. S. Krasnoscek 1982 12 p Transl. into ENGLISH from Rez. i Instrument (USSR), no. 23, 1980 p 3-10 (CSIR-Trans-1693) Avail: NTIS HC A02/MF A01

Diamond-spark erosion grinding on metallic bond is a highly productive process used in working difficult materials. It is of considerable interest to investigate the efficiency of diamond wheels in the grinding of hard alloys while supplying impulse energy to the cutting zone. The efficiency of 150 x 10 x 3 ACK cup wheels made with ACB diamonds on MB1 bond as evaluated experimentally by the multifactor method using the following optimized parameters: removal rate Q (cu mm/min), specific diamond consumption q (mg/g) and a specific grinding cost C (kopecks/cu cm). A TI5K6 hard alloy sample 60 sq mm in cross section was ground using a 3B642 grinder with a 3% soda solution as coolant. The cutting zone was supplied with electrical impulse energy from an SGI 40-440 generator. The mean current ranged from 4 to 10 amps, the impulse frequency was 88 kHz, the degree of porosity was 2, the anode was the diamond wheel and the cathode was the treated material. S.L.

N84-17419# Council for Scientific and Industrial Research, Pretoria (South Africa). Foreign Language Service.
DRESSING METHODS FOR GRINDING WHEELS MADE OF SUPERHARD ABRASIVE MATERIALS
G. Spur 1983 18 p refs Transl. into ENGLISH from Z. fuer Wirtsch. Fertigung (West Germany), v. 75, no. 7, 1980 p 307-312 (CSIR-Trans-1700) Avail: NTIS HC A02/MF A01

As a result of the increase in the use of difficult-to-machine materials more and more machining tasks are falling within the sphere of grinding. Since the requirements that must be met by the working accuracy under conditions of high productivity of the working cycle are becoming ever more stringent, high-capacity grinding tools are essential. The development of new, superhard abrasives has provided the necessary conditions for achieving technological and economic advantages in the machining of high-alloy materials. In this context cubic crystalline boron nitride (CBN) is used as an abrasive in a number of new fields. After diamond, CBN is the hardest abrasive. While the machining of hard metals is still the field in which diamond grinding wheels are used, the use of CBN grinding wheels in the machining of high alloy, heated treated high-speed steel offers technological and economic advantages. The principal reasons for this are to be found in the fact that CBN does not have a chemical affinity to the alloying elements of the steel, but has a greater thermal stability than diamond. Author

N84-17420# Council for Scientific and Industrial Research, Pretoria (South Africa). Foreign Language Service.
ON THE USE OF DIAMOND AND CUBICAL BORON NITRIDE ABRASIVES IN AUTOMATIC HONING APPLICATIONS
O. Kopp 1982 13 p Transl. into ENGLISH from Ind. Diamanten Rundschau (West Germany), v. 12, no. 2, 1978 p 118-122 (CSIR-Trans-1640) Avail: NTIS HC A02/MF A01

The tool life and performance characteristics of diamond and cubical boron nitride honing slips are examined in the light of the high degree of automation achieved in modern honing operations. Difficult aspects of the honing process determined by the continuous contact between tool and workpiece are discussed. The requirements which must be fulfilled by abrasives for use in automatic honing are discussed. Finally, the role of modern machine design in improving the dimensional and shape accuracy of honed borings is illustrated by means of examples. R.J.F.

N84-17421# Stanford Univ., Calif.
ACOUSTIC MICROSCOPY AT CRYOGENIC TEMPERATURES Annual Summary Report, 1 Jul. 1982 - 30 Jun. 1983
C. F. Quate Sep. 1983 14 p
(Contract N00014-77-C-0412)
(AD-A135089; GL-3628) Avail: NTIS HC A02/MF A01 CSCL 14/2

The acoustic microscope operating in superfluid helium now has a resolution of 500 Angstroms. The images from this instrument are superior to those in an optical microscope and exhibit some features that rival those of the SEM. Immediate progress should permit us to move up in frequency by a factor of two and improve the resolution accordingly. Another mode of imaging is described which exploits thermal phonons in solids and holds promise of providing information on the interior details of solid structures. GRA

N84-17422# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
TERMINAL WORK IN THE PROCESS INDUSTRY: EXPERIENCE IN A TIME PERSPECTIVE. PART 2: A FEW YEARS AFTER THE INSTALLATION
Mette Holmgren Jul. 1983 94 p refs In SWEDISH; ENGLISH summary
(FOA-C-56039-H2-Pt-2; ISSN-0347-7665) Avail: NTIS HC A05/MF A01

Operator attitudes towards computer based systems, and color terminals for process communication after two years of use are studied. The operators consider that these systems give a better process overview, making it easier to perceive disturbances, and facilitates process control. The results also show the influence of an adequate introduction to the systems upon the personnel's opinions of the system. Author (ESA)

N84-17423# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
CONCEPT STUDY OF AN AUTOMATIC ELLIPSOIDAL MIRROR FURNACE FACILITY, PREPHASE A. VOLUME 1: EXECUTIVE SUMMARY Final Report
J. Stapelmann Paris ESA 1982 21 p refs 2 Vol.
(Contract ESA-4952/81/F-FC(SC))
(ERC-RP-200-DS-009-Vol-1; ESA-CR(P)-1812-Vol-1) Avail: NTIS HC A02/MF A01

A 1500C (max) mirror for materials science experiments and for growing 40 mm crystals under microgravity in an add-on payload for a retrievable carrier is proposed. Parts of the Spacelab mirror furnaces which can be used are identified. Design solutions for modifications due to experimental requirements or to the automatic operation mode are developed. The complete new parts of the facility, such as the sample storage and exchange mechanism (SSEM) were investigated, and design solutions are presented. A design featuring two monoellipsoidal mirror furnaces with the SSEM situated in between, and no active control, is favored. Author (ESA)

N84-17424# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
CONCEPT STUDY OF AN AUTOMATIC ELLIPSOIDAL MIRROR FURNACE FACILITY, PREPHASE A. VOLUME 2: TECHNICAL DESCRIPTIONS Final Report
J. Stapelmann Paris ESA 1982 117 p 2 Vol.
(Contract ESA-4952/81/F-FC (SC))
(ERC-RP-200-DS-009-Vol-2; ESA-CR(P)-1812-Vol-2) Avail: NTIS HC A06/MF A01

A 1500 C (max) mirror furnace for materials science experiments and for growing 40 mm crystals under microgravity in an add-on payload for a retrievable carrier is proposed. Parts of the Spacelab mirror furnaces which can be used are identified. Design solutions for modifications due to experimental requirements or to the automatic operation mode are developed. The complete new parts of the facility, such as the sample storage and exchange mechanism (SSEM) were investigated, and design solutions are presented. A design featuring two monoellipsoidal mirror furnaces with the SSEM situated in between, and no active control is favored. Author (ESA)

N84-17425# National Bureau of Standards, Washington, D.C.
REPORT OF THE 68TH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES 1983
Albert D. Tholen, ed., Louis E. Barbrow, ed., and Ann P. Heffernan, ed. Sep. 1983 356 p Conf. held in Sacramento, Calif., 17-22 Jul. 1983

(PB84-110998; NBS-SP-663; LC-26-27766) Avail: NTIS HC A16/MF A01 CSCL 14B

Reports of the several standing and annual committee of the National Conference on Weights and Measures are presented. Major issues discussed include labeling of gasoline containing alcohol, national type evaluation, and development of training materials. GRA

N84-17426# Daedalean Associates, Inc., Woodbine, Md.
DEVELOPMENT OF A HIGH PRESSURE WATER JET FOR THE RAPID REMOVAL OF CONCRETE Final Report, 24 Sep. 1980 - 31 Jan. 1983
Feb. 1983 76 p
(Contract DFGH61-80-C-00143)
(PB84-109909; MGB-8027-001-FR; FHWA-TS-83-206) Avail: NTIS HC A05/MF A01 CSCL 13B

The objective of this program was to design, build and demonstrate a prototype concrete removal unit that utilized water cavitation erosion technology to accomplish the work. This final report presents an in-depth discussion of the significant elements of the program; specifically, the design considerations, the fabrication and laboratory testing and finally the field demonstration. In addition, there are separate sections which include a cost analysis and system comparison and the conclusion and recommendations that resulted from this program. GRA

N84-17427# National Bureau of Standards, Washington, D.C. National Engineering Lab.
CIVILIAN RESIDENTIAL FIRE FATALITY RATES: SIX HIGH-RATE STATES VERSUS SIX LOW-RATE STATES
John R. Hall, Jr. and Susan G. Helzer Aug. 1983 37 p refs Sponsored by part by the Federal Emergency Management Agency
(PB84-102615; NBSIR-83-2754) Avail: NTIS HC A03/MF A01 CSCL 13L

Results of an analysis of 1,600 fire fatalities occurring in six states with high fire-death rates and six states with low fire-death rates are presented. Reasons for the differences in rates are explored, with special attention to victim age, sex, race, and condition at time of ignition. Fire cause patterns are touched on only lightly but are addressed more extensively in the companion piece to this report, 'Rural and Non-Rural Civilian Residential Fire Fatalities in Twelve States', NBSIR 82-2519. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N84-17428 North Carolina State Univ., Raleigh.
AN ANALYTICAL STUDY OF CYLINDRICAL- AND SPHERICAL-RECTANGULAR MICROSTRIP ANTENNAS Ph.D. Thesis
Kuang-Yuh Wu 1983 125 p
Avail: Univ. Microfilms Order No. DA8318989

Two commonly used nonplanar microstrip antennas, cylindrical- and spherical-rectangular microstrip antennas, are studied. The cavity model method is used for the analysis of the cylindrical- and spherical-rectangular microstrip antennas. This method is based on the observations that the electric field at a perfect electric conductor must have no component tangential to the conductor surface, and the electric current in the radiating patch must have no component normal to the edge at any point on the edge. From the cavity boundary conditions the cavity field is obtained. Then, assuming that the microstrip structure is thin and exciting the antenna by a stripline the radiation fields are derived. Finally, power loss due to the conductors and the dielectric substrate and power radiated are obtained. The antenna radiation efficiency is also computed. For numerical computations, mathematical computer software for special functions--Gamma, Bessel, Hypergeometric and Legendre--is developed. Dissert. Abstr.

N84-17429 West Virginia Univ., Morgantown.
SWITCHED-CAPACITOR SAMPLED-DATA NETWORKS WITH COMMUNICATION APPLICATIONS Ph.D. Thesis
Shen Tu 1983 126 p
Avail: Univ. Microfilms Order No. DA8326660

Synthesis techniques for the realization of switched-capacitor filters (SCF's) as well as oscillators (SCO's) were developed. The proposed techniques are shown to yield realizations which have attractive features in comparison with presently available realizations. Direct synthesis procedures for the switched-capacitor filter is obtained from the transfer function is s-variable. It is shown that, by using the mixed transformation, a second order filter design of better approximation and less frequency warping is obtained. The switched-capacitor oscillators are discussed. A class of oscillation for multiphase sinewave generation is proposed. In the design, a sequence discreminator (SD) is used which provides a set of sinusoids with equally spaced phase angle and equal magnitude. Applying the SC technique to the oscillator design has several advantages in addition to the circuit being suitable for integration. Dissert. Abstr.

N84-17430 Elliott-Automation Space and Advanced Military Systems Ltd., Frimley (England).
ACHIEVEMENT OF ELECTROMAGNETIC COMPATIBILITY IN WEAPON SYSTEMS
C. R. Fry Sep. 1983 27 p Presented at Royal Naval Equipment Exhibition
Copyright. Avail: Issuing Activity

Ship design to ensure electromagnetic compatibility is discussed. Equipment specifications aspects, and electromagnetic compatibility policy control, implementation and tasks are treated. Project coordination and documentation are mentioned.
Author (ESA)

N84-17431*# LinCom Corp., Los Angeles, Calif.
USER MANUAL OF THE CATSS SYSTEM (VERSION 1.0) COMMUNICATION ANALYSIS TOOL FOR SPACE STATION Interim Report
C. S. Tsang, Y. T. Su, and W. C. Lindsey Nov. 1983 45 p
(Contract NAS9-16868)
(NASA-CR-171728; NAS 1.26:171728; TR-1183-8314) Avail: NTIS HC A03/MF A01 CSCL 17B

The Communication Analysis Tool for the Space Station (CATSS) is a FORTRAN language software package capable of predicting the communications links performance for the Space Station (SS) communication and tracking (C & T) system. An interactive software package was currently developed to run on the DEC/VAX computers. The CATSS models and evaluates the various C & T links of the SS, which includes the modulation schemes such as Binary-Phase-Shift-Keying (BPSK), BPSK with Direct Sequence Spread Spectrum (PN/BPSK), and M-ary Frequency-Shift-Keying with Frequency Hopping (FH/MFSK). Optical Space Communication link is also included. CATSS is a C & T system engineering tool used to predict and analyze the system performance for different link environment. Identification of system weaknesses is achieved through evaluation of performance with varying system parameters. System tradeoff for different values of system parameters are made based on the performance prediction. Author

N84-17432*# TRW Electronic Systems Group, Redondo Beach, Calif. Military Electronics Div.
S-BAND SBAW MICROWAVE SOURCE, PHASE 2 Final Report
Nov. 1983 42 p
(Contract NAS5-26658)
(NASA-CR-175153; NAS 1.26:175153) Avail: NTIS HC A03/MF A01 CSCL 20N

Results of aging experiments on 1.072 GHz SBAW oscillators

are discussed as well as the design, fabrication and test of 2.143 GHz SBAW delay lines. Two design approaches were implemented. The third harmonic transducer on 36 deg rotated Y cut quartz proved to be the most useful design, whereas the fifth harmonic transducer on - 50 5 deg rotated Y cut quartz suffered from high insertion loss and poor sidelobe rejection. The construction and characterization of the 2 GHz SBAW oscillator are described. Phase noise, frequency dependence on temperature, and 6-month aging were measured. Some SAW and SBAW oscillators were compared as were both the 1 and 2 GHz oscillators. The 2 GHz SBAW oscillator showed significant improvement in phase noise and temperature stability over the 2 GHz SAW oscillator developed in previous NASA programs. A technique to produce SBAW delay lines of different frequencies from a single mask is examined. The delay lines were incorporated into oscillator circuits to demonstrate the ability to select the frequency output of the SBAW oscillator. A.R.H.

N84-17433*# Arizona State Univ., Tempe. Dept. of Psychology.
HUMAN FACTORS ISSUES ASSOCIATED WITH THE USE OF SPEECH TECHNOLOGY IN THE COCKPIT
Z. A. Kersteen and D. Damos Dec. 1983 83 p refs
(NASA-CR-166548; NAS 1.26:166548) Avail: NTIS HC A05/MF A01 CSCL 17B

The human factors issues associated with the use of voice technology in the cockpit are summarized. The formulation of the LHX avionics suite is described and the allocation of tasks to voice in the cockpit is discussed. State-of-the-art speech recognition technology is reviewed. Finally, a questionnaire designed to tap pilot opinions concerning the allocation of tasks to voice input and output in the cockpit is presented. This questionnaire was designed to be administered to operational AH-1G Cobra gunship pilots. Half of the questionnaire deals specifically with the AH-1G cockpit and the types of tasks pilots would like to have performed by voice in this existing rotorcraft. The remaining portion of the questionnaire deals with an undefined rotorcraft of the future and is aimed at determining what types of tasks these pilots would like to have performed by voice technology if anything was possible, i.e. if there were no technological constraints. S.L.

N84-17434*# New Mexico State Univ., Las Cruces. Physical Science Lab.
MULTIFREQUENCY SYNTHETIC APERTURE RADAR ANTENNA COMPARISON STUDY Final Report
Bruce A. Blevins Sep. 1983 41 p refs
(Contract NAS9-95519)
(NASA-CR-171736; NAS 1.26:171736) Avail: NTIS HC A03/MF A01 CSCL 17I

Three multifrequency, dual polarization SAR antenna designs are reviewed. The SAR antenna design specifications were for a 'straw man' SAR which would approximate the requirements for projected shuttle-based SAR's. Therefore, the physical dimensions were constrained to be compatible with the space shuttle. The electrical specifications were similar to those of SIR-A and SIR-B with the addition of dual polarization and the addition of C and X band operation. Early in the antenna design considerations, three candidate technologies emerged as having promise. They were: (1) microstrip patch planar array antennas, (2) slotted waveguide planar array antennas, and (3) open-ended waveguide planar array antennas. S.L.

N84-17435*# Texas Univ., Austin. Applied Research Labs.
APQ-102 IMAGING RADAR DIGITAL IMAGE QUALITY STUDY Final Report, 1 Nov. 1981 - 31 Oct. 1982
Carroll R. Griffin and James M. Estes 11 Nov. 1982 102 p refs (Contract NAS9-16497)
(NASA-CR-171738; NAS 1.26:171738; ARL-TR-82-68) Avail: NTIS HC A06/MF A01 CSCL 17I

A modified APQ-102 sidelooking radar collected synthetic aperture radar (SAR) data which was digitized and recorded on wideband magnetic tape. These tapes were then ground processed into computer compatible tapes (CCT's). The CCT's may then be processed into high resolution radar images by software on the CYBER computer. S.L.

N84-17436*# Old Dominion Univ., Norfolk, Va. Dept. of Electrical Engineering.
AIRBORNE ANTENNA PATTERN CALCULATIONS Final Report, 1 Nov. 1982 - 31 Oct. 1983
Ali B. Bagherian and Roland R. Mielke Dec. 1983 106 p refs (Grant NsG-1655)
(NASA-CR-173284; NAS 1.26:173284) Avail: NTIS HC A06/MF A01 CSCL 20N

Use of calculation program START and modeling program P 3D to produce radiation patterns of antennas mounted on a space station is discussed. Basic components of two space stations in the early design stage are simulated and radiation patterns for antennas mounted on the modules are presented. Author

N84-17437*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
ANALYSIS OF LONGWAVE RADIATION FOR THE EARTH-ATMOSPHERE SYSTEM Final Report, period ending 31 Jul. 1983
S. N. Tiwari, C. S. Venuru, and S. V. Subramanian Nov. 1983 155 p refs
(Grant NAG1-21)
(NASA-CR-173155; NAS 1.26:173155) Avail: NTIS HC A08/MF A01 CSCL 20N

Accurate radiative transfer models are used to determine the upwelling atmospheric radiance and net radiative flux in the entire longwave spectral range. The validity of the quasi-random band model is established by comparing the results of this model with those of line-by-line formulations and with available theoretical and experimental results. Existing radiative transfer models and computer codes are modified to include various surface and atmospheric effects (surface reflection, nonequilibrium radiation, and cloud effects). The program is used to evaluate the radiative flux in clear atmosphere, provide sensitivity analysis of upwelling radiance in the presence of clouds, and determine the effects of various climatological parameters on the upwelling radiation and anisotropic function. Homogeneous and nonhomogeneous gas emissivities can also be evaluated under different conditions. A.R.H.

N84-17438# Army Engineer Topographic Labs., Fort Belvoir, Va.
APPLICATION OF A FEATURE SELECTION TECHNIQUE TO SAMPLES OF HIGH RESOLUTION SYNTHETIC APERTURE RADAR IMAGERY
Richard A. Hevenor Jul. 1983 31 p
(DA Proj. 4A1-61102-B-52-C)
(AD-A135006; ETL-0330) Avail: NTIS HC A03/MF A01 CSCL 17/9

A feature selection technique was applied to samples of synthetic aperture radar imagery. This technique was applied to four classes of terrain features on selected samples of radar imagery. The four classes considered were forests, cities, agricultural fields, and water. A feature vector was computed from samples of each class. A linear transformation was utilized to develop a new feature vector of reduced dimensionality. This transformation chooses those features that are most effective for performing class separability. Author (GRA)

N84-17439# Air Force Academy, Colo. Dept. of Electrical Engineering.
PROCEEDINGS OF THE SYMPOSIUM ON MILITARY SPACE COMMUNICATIONS AND OPERATIONS
1983 125 p Proc. held at USAF Acad., Colo., 2-4 Aug. 1983
(AD-A135021) Avail: NTIS HC A06/MF A01 CSCL 05/1

This document on military Space Communications and Operations contains papers presented at the following seven sessions: (1) Operational Concepts/Missions; (2) Network Control/Architecture; (3) Space System Survivability/Reliability; (4) Space System Technology/Analysis; (5) DoD Command and Control

Centers; (6) Policy, Strategy and Legal Aspects of Space; (7) Simulation and Testing. GRA

N84-17440# Massachusetts Inst. of Tech., Cambridge. Statistics Center.
NYQUIST FREQUENCY
Y. C. Yao Sep. 1983 7 p
(Contract N00014-75-C-0555)
(AD-A135023; TR-32-ONR) Avail: NTIS HC A02/MF A01 CSCL 09/4

The Nyquist frequency is half the sampling frequency when a continuous-time function is sampled at equally spaced time points. That is, the Nyquist frequency is pi/delta (in radians per unit time) where delta is the time interval between two successive sampled data. This report discusses the basic ideas of the Nyquist frequency and explains its relationship between aliasing and the sampling theorem. GRA

N84-17441# Weissman (David E.), Northport, N.Y.
A STUDY OF THE DEPENDENCE OF RADAR BACKSCATTER CROSS SECTION ON WIND SPEED AND WAVE SLOPE FROM THE MARSEN EXPERIMENTAL RESULTS (A CONTRIBUTION TO STUDIES OF RADAR BACKSCATTERING FROM THE SEA SURFACE). SUPPLEMENT TO FINAL REPORT
D. E. Weissman Nov. 1983 15 p
(Contracts N00014-83-M-0433; N00014-83-M-0081)
(AD-A135041; AD-E301256; DEW-83-2) Avail: NTIS HC A02/MF A01 CSCL 20/14

An analysis of the radar cross section data acquired from the NORDSEE tower during the MARSEN Experiment by the Naval Research Laboratory was made. A dependence on both wind speed and sea state was expected, based on observations and results obtained during the Gulf of Mexico Experiment. The range of variation of wind speed and wave slope during MARSEN were substantial. However, within a narrow range of wind speeds the range of variation of wave slopes was insufficient to demonstrate a radar cross section dependence on it. The results contained herein display appreciable randomness at each slope value; this tends to mask a likely dependence of radar cross section on slope. These results do not conflict with those obtained in the Gulf of Mexico, some of which are included for comparison, they are just too limited in range to add independent support. GRA

N84-17442# New Mexico State Univ., Las Cruces. Physical Science Lab.
CYLINDRICAL MICROSTRIP ARRAY: C-BAND BEACON ANTENNA ARRAY WITH 48 RECTANGULAR RADIATING ELEMENTS FED IN-PHASE
H. D. Weinschel and A. Waterman Jul. 1983 32 p
(Contract F19628-81-C-0004; AF Proj. 6759)
(AD-A135144; PC-01036; SATGL-TR-83-0218; SR-1) Avail: NTIS HC A03/MF A01 CSCL 09/5

The Physical Science Laboratory/NMSU has designed a C-Band microstrip array for a nominal 17 inch diameter vehicle. Impedance and radiation pattern measurements were made on a prototype antenna. Author (GRA)

N84-17443# Texas Univ., Austin. Microwave Lab.
A STUDY OF MICROWAVE AND MILLIMETER-WAVE QUASI-OPTICAL PLANAR MIXERS
K. D. Stephan and T. Itoh 31 Aug. 1983 214 p
(Contract DAAG29-81-K-0053)
(AD-A135252; MW-83-2; ARO-17735.25-EL) Avail: NTIS HC A10/MF A01 CSCL 09/5

Quasi-optical mixers promise to simplify microwave and millimeter-wave receiving and remote sensing systems, especially where imaging of the field of view is desired. Two types of quasi-optical mixers were studied both experimentally and theoretically. One mixer used a slot-ring antenna, while the other used a bowtie antenna and an antiparallel diode pair to allow subharmonic local oscillator pumping. Both mixers are suitable for monolithic integration at millimeter wavelengths. The slot-ring antenna is formed by cutting an annular slot in a metallic sheet coated on one side with a dielectric layer. If a simple radial electric field distribution in the slot is assumed at the resonant frequency of the first-order mode, a Hankel-transform domain analysis permits prediction of the radiation patterns and radiation resistance of the antenna. These predictions were confirmed by measurement. An X-band balanced mixer model showed a measured conversion loss of 6.5 dB + or - 3.1 dB when fed by a local oscillator source behind the antenna. GRA

N84-17444# Illinois Univ., Urbana. Electromagnetics Lab.
STUDIES IN FIN-LINE ANTENNA DESIGN FOR PHASED ARRAY APPLICATIONS Interim Technical Report
E. Farr, K. Webb, and R. Mittra Nov. 1983 21 p
(Contract DAAG29-82-K-0084)
(AD-A135255; UIEM-83-14; UILU-ENG-83-2558; ARO-18054.9-EL) Avail: NTIS HC A02/MF A01 CSCL 17/9

An experimental study was conducted concerning the development of an endfire fin-line antenna, suitable for phased array applications at 220 GHz. Experimental models of several designs were built and tested at 80 GHz. Author (GRA)

N84-17445# IIT Research Inst., Chicago, Ill.
EXTREMELY LOW FREQUENCY (ELF) COMMUNICATIONS SYSTEM ECOLOGICAL MONITORING PROGRAM: PLAN AND SUMMARY OF 1982 PROGRESS Summary Report, for 1982
J. E. Zapotosky and M. M. Abromavage Aug. 1983 101 p
(Contract N00039-81-C-0357)
(AD-A135482; IITRI-E06516-6) Avail: NTIS HC A06/MF A01 CSCL 06/6

The purpose of the Ecological Monitoring Program is to study ecological and/or biological characteristics of selected biota in an environment that includes natural stresses and low-level ELF electromagnetic fields. Sixteen general types of organisms from three major ecosystems in the System area are being examined. Study sites were selected in 1982, and will be examined further in 1983. Statistical methods of analysis proposed by investigators are identified, and biological and ecological end-points selected for study are described. Data collection began in 1982 and will be continued in 1983 for studies of vegetation, soil animals, pollinating insects, small mammals and birds, wetlands, vegetation associations, and aquatic community relationships. GRA

N84-17446# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.
TEST OPERATIONS PROCEDURE: SIGNAL CONVERTERS Final Report
10 Aug. 1983 42 p Supersedes MTP-6-2-050
(AD-A134615; TOP-6-2-050; MTP-6-2-050) Avail: NTIS HC A03/MF A01 CSCL 17/2

This test operations procedure (TOP) delineates general test and specific subtest procedures required to measure the technical performance of Signal Converters. Comparison of test results with criteria and technical specifications permits evaluation of the their suitability for an intended use. Signal Converters are required to effect ovrall signaling compatiblity in the many types and combinations of communication facilities, systems and associated signaling chemes comprising a military network. This TOP is limited to test outlined herein, which are applicable only to signal converters whose principal purpose is to alter the form of telephone or telegraph functional signals having dissimilar line or terminal signaling characteristics. Functional signals are defined as those employed in most communication circuits to operate signaling devices or switching equipment as opposed to the-intelligence-bearing signals. Applicable common engineering tests TOPs are listed but not included. GRA

N84-17447# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SAMPLING MISMATCH AND TIMING JITTER IN PULSE-DOPPLER RADAR
S. C. Pohlig 9 Sep. 1983 40 p
(Contract F19628-80-C-0002)
(AD-A134683; TR-646; ESD-TR-83-042) Avail: NTIS HC A03/MF A01 CSCL 17/9

Pulse-Doppler processing is an often used technique for extracting range and Doppler information of targets. Such a system can be described as consisting of three basic components, a pulse compressor, sampler, and Doppler processor. When quadrature detection is used, the gains and timing of the sampled inphase and quadrature components of the pulse compressor output must be matched in order to minimize distortion and noise at the Doppler processor output. In addition, the jitter in the sampling times also caused distortion and noise. This report presents an analysis of these effects and describes the signal degradations due to mismatch and jitter in the sampler. Author (GRA)

N84-17448# Mitre Corp., Bedford, Mass.
JAM-RESISTANT SPEECH ENCODING Phase Report, Oct. 1981 - Sep. 1982
M. A. Poole and R. Rifkin Jun. 1983 66 p
(Contract F19628-82-C-0001; AF Proj. MOIE)
(AD-A134707; MTR-8827; RADC-TR-83-89) Avail: NTIS HC A04/MF A01 CSCL 17/4

This report describes techniques that provide increased jam resistance for digitized speech. Methods for increasing the jam resistance of pulse code modulated data are analyzed and evaluated in listener tests. Special emphasis is placed on new voice encoding approaches that take advantage of a spread spectrum system with a variable (or multiple)-data-rate/variable (or multiple)-AJ capability. Methods for matching a source to a channel in a jamming environment are investigated. Several techniques that provide about a 4 dB increase in jam resistance have been identified. Author (GRA)

N84-17449# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.
TEST OPERATIONS PROCEDURE (TOP): DATA TRANSMISSION EQUIPMENT Final Report
Sep. 1983 28 p Supersedes MTP-6-2-065
(AD-A134711; TOP-6-2-065; MTP-6-2-065-Rev) Avail: NTIS HC A03/MF A01 CSCL 17/2

This test operations procedure (TOP) delineates general engineering test procedures for measuring and evaluating the technical performance and characteristics of data channel terminal equipment and communications system facilities with respect to their data transmission capability relative to criteria specified in the Required Operational Capability, Letter Requirements, and Coordinated Test Program. This TOP excludes consideration of equipments which are designed or required solely to resolve automatic data processing (ADP) equipment anomalies or to perform ADP control functions external to a central processor or input output device. Examples are: Speed buffers or modulation rate converters, Error control systems, Code converters, Alphabet translators, and Special security devices. GRA

N84-17450# Naval Ocean Systems Center, San Diego, Calif.
MICROFICHE IMAGE TRANSMISSION SYSTEM (MITS) DEMONSTRATION FIELD EVALUATION OF MICROFACSIMILE
D. L. Endicott, Jr. 26 May 1983 66 p
(AD-A134716; AD-E301247; NOSC/TR-813) Avail: NTIS HC A04/MF A01 CSCL 09/2

The MITS Demonstration was conducted for a 6-month period between 14 December 1981 and 11 June 1982. During that period, more than 1000 microfiche containing about 22,000 personnel document images were electronically transmitted between NMPC and the Personnel Support Detachment, Anacostia. These fiche represented nearly 300 active Navy personnel records. The average turnaround time was 46 minutes between making a request and receiving a facsimile record. This time included retrieval of the master microfiche, duplication, scanning, data transmission, and facsimile recording. The average scanning/transmission time was 15 minutes per record slightly less than 8 seconds per document image. The facsimile documents were found to be useful to the recipients, but improvements in both the output quality and the system itself are necessary to ensure effective implementation of an operational configuration. Author (GRA)

N84-17451# Rome Air Development Center, Griffiss AFB, N.Y.
S-BAND RANGE TRACKER AND SURVEILLANCE LAB INTERFACE
B. D. Bush Sep. 1983 104 p
(AF Proj. 4506)
(AD-A134730; AD-E301230; RADC-TR-83-213) Avail: NTIS HC A06/MF A01 CSCL 17/9

This report documents the design, construction, test and laboratory integration of the range tracker and associated subsystems for the RADC/OC Surveillance Laboratory's S-Band tracking radar. This development was accomplished over the period from December 1981 to November 1983 and was designed, constructed and tested entirely in-house. This report contains information on the use of the range tracker, its interfaces to other laboratory equipment, the philosophy behind its design, the detailed design of the hardware (including schematics, timing and cabling diagrams), the detailed software design (including flowcharts), and the mathematical description of its algorithms. The range tracker will be used in conjunction with other equipment in the OC Surveillance Lab in the taking and recording of radar data during flight tests. Author (GRA)

N84-17452# Army Missile Command, Redstone Arsenal, Ala. Advanced Sensors Directorate.
ATMOSPHERIC SCINTILLATION AT 94 GHz
P. M. Alexander and H. M. Grass 1 Dec. 1982 52 p
(AD-A134743; AD-E950457; DRSMI-RE-83-16-TR) Avail: NTIS HC A04/MF A01 CSCL 17/9

An experimental 94 GHz transmitter and receiver were developed for measuring amplitude fluctuations due to clear-air turbulence. Atmospheric scintillation theory is discussed, and experimental conditions are described. Atmospheric fluctuations could not be observed above the transmitter/receiver noise, thus establishing an estimated upper bound that was about a factor of ten lower than fluctuations predicted from optical theory. Author (GRA)

N84-17453# Naval Research Lab., Washington, D. C. Software Systems and Support Branch.
A NEW DERIVATION FOR THE ROUGH SURFACE REFLECTION COEFFICIENT AND FOR THE DISTRIBUTION OF SEA WAVE ELEVATIONS Final Report
A. R. Miller, R. M. Brown, and E. Vegh 30 Sep. 1983 6 p
(W1253)
(AD-A134774; NRL-8744) Avail: NTIS HC A02/MF A01 CSCL 20/14

In this report the rough surface reflection coefficient for the coherent reflected field is derived. The result obtained assumes a plane wavefront incident on a Gaussian collection of sinusoidal surface waves with uniform phase distribution. The theoretical result obtained is compared with experimental data. In addition, the probability density function of sea wave elevations is obtained. Author (GRA)

N84-17454# Massachusetts Inst. of Tech., Cambridge.
A CATALOGUE OF SPREADING MODULATION SPECTRA
E. J. Kelly 20 Sep. 1983 125 p
(Contract F19628-80-C-0002)
(AD-A134850; TR-596; ESD-TR-83-053) Avail: NTIS HC A06/MF A01 CSCL 17/4

Spreading modulation waveforms are discussed in general terms, and a classification system is described. Several well-known examples are given, and a new, standard set of spreading modulations is introduced. Spectra of all the waveforms are given, and spectral properties are discussed in relation to system performance. It is shown that these properties are essentially determined by three waveform parameters, for a large class of spreading modulations. Author (GRA)

N84-17455# North Carolina Univ., Chapel Hill. Dept. of Statistics.
CAPACITY OF MISMATCHED GAUSSIAN CHANNELS
C. R. Baker 1983 15 p

(Contracts N00014-75-C-0491; N00014-81-K-0373)
(AD-A134982; AD-E401102) Avail: NTIS HC A02/MF A01 CSCL 12/1

The capacity of the Gaussian channel without feedback, subject to a generalized energy constraint, is determined in an earlier document. In that work, the constraint is given in terms of the covariance of the channel noise process. However, there are many situations where one may wish to determine capacity subject to a constraint determined by a covariance that is different from that of the channel noise. An example is in jamming or countermeasures situations. Channels where the covariance of the noise is the same as that of the constraint will be called matched channels; otherwise, we say that the channel is mismatched (to the constraint). In this paper, the capacity of the mismatched Gaussian channel is determined for two situations; the finite-dimensional channel, and the infinite-dimensional channel with a dimensionality constraint on the space of transmitted signals. Results on the infinite-dimensional mismatched channel without a dimensionality constraint on the signal are given elsewhere. Various special cases of the mismatched channel have been treated previously. The results for the mismatched channel differ significantly from those for the matched channel. A discussion of these differences follows the proof of the main result. GRA

N84-17456# Bell-Northern Research Ltd., Ottawa (Ontario).
CODING OF FULL MOTION COLOR VIDEO SIGNALS AT 50 kb/s Final Report
E. Gulko and S. Sabri Aug. 1983 57 p
(Contract MDA903-82-C-0390; ARPA Order 4270)
(AD-A134319) Avail: NTIS HC A04/MF A01 CSCL 17/2

This report describes a video coder operating at 56 kb/s or 64 kb/s. The coder was designed for possible use in the proposed National Command Authority Teleconferencing System. The system provides multisite, multimedia conferencing. It assumes one participant per site. Under certain conditions, availability of communications bandwidth can be drastically lowered. This report presents the coding algorithm for operation at 56-64 kb/s transmission bit rates. In this case, a capacity of 50 kb/s is allocated for the video information, while the remaining 6 - 14 kb/s is reversed for framing, error control, and other overhead. GRA

N84-17457# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
INVESTIGATION OF ENCRYPTATION FOR SATELLITE COMMUNICATIONS [EN STUDIE AV KRYPTERING VID SATELLITKOMMUNIKATION]
Sven Nygren Dec. 1982 57 p refs In SWEDISH
(FOA-C-30300-E1) Avail: NTIS HC A04/MF A01

Data acquisition with satellite-borne photography is outlined; encoding and decoding methods are discussed. Encoding tests of image data are presented. It is shown that block encoding is not a suitable encryption form, but methods using common keys (e.g. addition coding) which give a high safety degree are acceptable. Trends in the development of electronics, encryption, and image processing are discussed. Author (ESA)

N84-17458# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
NUCLEAR EXPLOSION EFFECTS ON TELECOMMUNICATION, ETC. (EFFECT OF EMP AND OF IONIZING RADIATION ON ELECTRONICS AND OPTICAL ELECTRONICS [KAERNLADDNINGARS VERKAN PAA TELESAMBAND M M (EMP-OCH JONISERANDE STRAALNINGS VERKAN PAA ELEKTRONIK OCH OPTRONIK)]
Sture Risberg and Gunnar Goeransson Nov. 1982 27 p In SWEDISH
(FOA-C-30302-A3) Avail: NTIS HC A03/MF A01

Nuclear explosion effects and Swedish defense statements concerning data and teletransmission during nuclear warfare are outlined. Two models of bounded-wave simulators for studying EMP-fields are presented and the effects of EMP and of the initial ionizing radiation are analyzed. The EMP effects are most important for electrical and electronic systems, and for explosives combined with electrical devices. The influence of radioactive fallout on fiber optics is outlined. Author (ESA)

N84-17459# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
COMPARATIVE ANTENNA MEASUREMENTS IN REAL ENVIRONMENT: STEERABLE NULL ANTENNA AT 30 - 76 MHz [JAEMFOERANDE ANTENNMAETNING I VERKLIG MILJOE: STYRBAR NOLLANTENN FOER 30 - 76 MHZ]
Folke Land, Boerje Asp, Lars Ladell, and Stellan Nilsson Oct. 1982 27 p refs In SWEDISH
(FOA-C-30303-E2) Avail: NTIS HC A03/MF A01

A steerable null antenna processor, to be used on vehicles, was tested in real environment conditions. It can cut an undesirable signal coming from any chosen direction. Only one perturbing signal emission device was used for each test. A disturbance attenuation of 40 dB is noted. The antenna charts present one or two distinct minima for the desired and for the undesirable signal. Measurements in a forestry site with strong multipath transmission show the expected perturbation attenuation in the definite direction; the desired signal is very little or not at all attenuated. Author (ESA)

N84-17460# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
A PROGRAM FOR COMPUTER-CONTROLLED IMPEDANCE MEASUREMENT WITHIN THE MICROWAVE RANGE
Pernilla Goekstorp Jun. 1983 66 p In SWEDISH; ENGLISH summary
(FOA-C-30330-E3; ISSN-0347-3708) Avail: NTIS HC A04/MF A01; Research Inst. of National Defence, Stockholm KR 50

A program for computer-controlled impedance measurement on antennas, by means of a network analyzer, sweep generator, and frequency counter, is presented. The reflection factor was measured. The corresponding scattering parameter was determined in the form of its amount and phase from which the complex number S11 was obtained, corrected by parameters, and stored on a file specified by the user. The correction parameters were determined by a calibrating routine preceding the measurement. A minicomputer was used for control and monitoring of the measuring data. A program plotting the S-parameters in a Smith chart is shown. Author (ESA)

N84-17461# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
SILENT RADAR: A STUDY OF THE PERFORMANCES OF A NAVIGATIONAL RADAR WITH LIMITED RANGE
Bodil Anjar Aug. 1983 53 p refs In SWEDISH; ENGLISH summary
(FOA-C-30334-E1; ISSN-0347-3708) Avail: NTIS HC A04/MF A01; Research Inst. of National Defence, Stockholm KR 50

Use of frequencies around 60 GHz for radar systems, to prevent enemy electronic spying at ranges longer than 35 to 40 Km (due to the very high atmospheric attenuation at these frequencies) was studied. If the radar equipment is working in the range 50 to 52 GHz, the radar range is at least 3 Km for most weather conditions. At precipitation intensities of more than 2 mm/hr and at visibilities below 30 m, the range is shorter. A transmitter with an average power of 1 Kw is required for this system. Author (ESA)

N84-17462# Bundesministerium fuer Forschung und Technologie, Bonn (West Germany).
DIGITAL SOUND SERVICE FOR DIRECT BROADCASTING SATELLITES
D. Treytl, ed. (DFVLR, Cologne) 1983 128 p refs In ENGLISN and GERMAN
Avail: NTIS HC A07/MF A01

A 16 channel (4 phase (CPSK), or 12 channel (2 phase CPSK) digital sound link for the TV Sat satellite is proposed. Small parabolic antennas suitable for sound and TV broadcasts assure reception. A specially developed tuner allows the user to

select either a given program from 1 of 16, or 1 of 8 types of program, e.g., sport or opera. Tests with OTS satellite and a cable distribution network prove the feasibility of the proposal. Encoding, transmission, signal modulation and links are outlined. Equipment is described. Author (ESA)

N84-17463# Telespazio, S.p.A., Rome (Italy).
TRAFFIC ROUTING IN A SWITCHED REGENERATIVE SATELLITE. VOLUME 1, TASK 3: TRAFFIC ASSIGNMENT
Paris ESA Dec. 1982 108 p refs 2 Vol.
(Contract ESTEC-4626/81/NL-MS(SC))
(ESA-CR(P)-1792-Vol-1) Avail: NTIS HC A06/MF A01

Time plan assignment in a multibeam SS-TDMA is discussed. System features fixed by the designer, such as the number and the speed of ground terminals installed in each station, and the number and the speed of satellite transponders working in each spot are described. Linkage among terminals and transponders is also discussed, including having more than one transponder linked to one terminal. A procedure to achieve a switching plan with high efficiency, taking into account all system constraints such as no bursts breaking and two transmission rates harmonization is proposed. Algorithms to be implemented are: the Hungarian method; branch and bound; the INSERT heuristic; and the HOLE heuristic. Computer programs were developed, and a time plan for a European Satellite System is produced. Author (ESA)

N84-17464# Telespazio, S.p.A., Rome (Italy).
TRAFFIC ROUTING IN A SWITCHED REGENERATIVE SATELLITE. VOLUME 2, TASK 4: REVIEW (EXECUTIVE SUMMARY)
G. Barberis (Centro Studi e Laboratori Telecommunicazione) Paris ESA Dec. 1982 65 p refs 2 Vol.
(Contract ESTEC-4626/81/NL-MS(SC))
(ESA-CR(P)-1792-Vol-2) Avail: NTIS HC A04/MF A01

A communications satellite design for 1990's European use is proposed. Time plan assignment is discussed. The satellite system should be interfaced with the terrestrial telephone network at several nodes per nation (rather than at one node per nation as for ECS). A 64 Kbit/sec ISDN service and a specialized 2.048 Mbit/sec service on reservation basis are suggested. Wide use of the 12/14 and 20/30 GHz bands is advocated. A procedure to achieve a switching plan with high efficiency, taking into account all system constraints such as no bursts breaking and two transmission rates harmonization is proposed. Algorithms to be implemented are: the Hungarian method; branch and bound; the INSERT heuristic; and the HOLE heuristic. Author (ESA)

N84-17465# Philips Telecommunication Industries, Hilversum (Netherlands).
CORRELATIVE PHASE MODULATION FOR FIXED SATELLITE SERVICES, VOLUME 1 (PHASE 1)
D. Muilwijk and J. H. Schade Paris ESA Jan. 1983 380 p refs Revised 2 Vol.
(Contract ESTEC-4485/80/NL-MS(SC))
(PTI-SB-2363-21-3505-Vol-1; ESA-CR(P)-1793-Vol-1) Avail: NTIS HC A17/MF A01

The feasibility of correlative phase modulation (CPM) for fixed satellite services was studied. With CPM for the Earth station transmitter a saturated amplifier can be used and there is no need for any transmitter RF filtering. A binary scheme (tamed frequency modulation or a raised cosine shaping) and a quaternary scheme (correlative phase shift keying or a raised cosine shaping), both with modulation index 0.5 are discussed. The binary scheme offers a bandwidth efficiency approaching 1.4 bits/sec/Hz, (satellite) power efficiency similar to QPSK and a simple implementation with a QPSK-like receiver. The quaternary scheme offers a slightly lower bandwidth efficiency (satellite) power efficiency 2 dB better than for QPSK, but requires a more complex implementation, while the maximum bitrate is limited to 8 Mb/sec with today's technology and to 25 Mb/sec in the near future. Author (ESA)

N84-17466# Philips Telecommunication Industries, Hilversum (Netherlands).
CORRELATIVE PHASE MODULATION FOR FIXED SATELLITE SERVICE-S. VOLUME 2: SUPPLEMENTARY REPORT
D. Muilwijk and J. H. Schade Paris ESA Aug. 1983 128 p ref Revised 2 Vol.
(Contract ESTEC-4485/80/NL-MS(SC))
(PTI-SB-2363-21-3794-Vol-2; ESA-CR(P)-1793-Vol-2) Avail: NTIS HC A07/MF A01

Performance under fixed satellite service conditions of a binary correlative phase modulation (CPM) scheme with simple implementation, and more complex quaternary CPM schemes was simulated. Compared to QPSK the CMP schemes have an important power advantage in the uplink as a saturated Earth station power amplifier can be used without any rf filtering; the power efficiency in the downlink is comparable to QPSK for the binary scheme and 2 dB higher for the quaternary schemes. The spectrum efficiency is 1.25 to 1.40 bits/sec/Hz for the binary scheme and 1.10 to 1.25 bits/sec/Hz for the quaternary scheme, the precise figure depending on interference conditions. Carrier regeneration is shown to benefit significantly from sampling with the symbol clock; channel distorsions have no serious effect. Though no general design concept is offered, the combination of coding with general CPM is shown to be promising. Author (ESA)

N84-17467# Institute for Telecommunication Sciences, Boulder, Colo.
THE USE OF BURST TRANSMISSION TO INCREASE COMMUNICATION RANGE: A FEASIBILITY STUDY
G. A. Hufford, W. A. Kissick, A. G. Longley, and H. T. Dougherty Aug. 1983 97 p refs Sponsored in part by Army Communications Systems Agency
(PB84-111400; NTIA-83-130) Avail: NTIS HC A05/MF A01 CSCL 17B

The concepts of a burst transmission system are examined in the contest of using the location variability to estimate the waiting distance, and the associated range extension, in terms of the correlation distance of the received signal level. Using this theory and both previous and current measurements the correlation distance is estimated and, hence, so is the waiting distance. The estimates of the correlation distance range from 200 to 800 m. Recommendations for future efforts are proposed. GRA

N84-17468# Institute for Telecommunication Sciences, Boulder, Colo.
ESTIMATING THE PERFORMANCE OF TELECOMMUNICATION SYSTEMS USING THE IONOSPHERIC TRANSMISSION CHANNEL. IONOSPHERIC COMMUNICATIONS ANALYSIS AND PREDICTION PROGRAM USER'S MANUAL
L. R. Teters, J. L. Lloyd, G. W. Haydon, and D. L. Lucas Jul. 1983 222 p refs
(PB84-111210; NTIA/REPORT-83/127) Avail: NTIS HC A10/MF A01 CSCL 17B

The operation and use of the Ionospheric Communications Analysis and Prediction Program (IONCAP) is described. The computer program is an integrated system of subroutines designed to predict high frequency (HF) skywave system performance and analyze ionospheric parameters. These computer aided predictions may be used in the planning and operation of high frequency communication systems using skywaves. Instructions for the use of IONCAP are given. A description of the input data requirements, including data definition, organization, and instructions for setup of the various analysis tasks, is presented. Procedures and formats are given for preparing the input data and executing the program. The various outputs are presented and described with an interpretation of the analysis results. GRA

N84-17469# National Telecommunications and Information Administration, Annapolis, Md.
FM SPECTRAL MODELING AND FDM/FM SIMULATION PROGRAMS
Cesar A. Filippi Oct. 1983 91 p refs
(PB84-118934; NTIA/REPORT-83/134) Avail: NTIS HC A05/MF A01 CSCL 17B

Frequency modulation spectral modeling and Gaussian approximation principles are analyzed and extended to develop

computer simulation programs capable of providing representative FM spectra. A generalized program is developed to accommodate a variety of baseband and preemphasis characteristics, and adapted to generate FDM/FM telephony spectra. The program features the automatic validation and generation of the gaussian spectrum model if applicable, or the automatic simulation of the modulation process to generate the FM spectrum samples otherwise. The program is used to simulate a collection of satellite FDM/FM telephony spectra, which are to be applied as input data into other available interference analysis programs, as part of a major automated computer capability dedicated to the comprehensive assessment of orbital congestion and spectrum resource management concerns pertinent to national and international satellite communication systems scenarios. GRA

N84-17470# Federal Communications Commission, Washington, D. C. Office of Science and Technology.

ANALYSIS OF TECHNICAL POSSIBILITIES FOR FURTHER SHARING OF THE UHF TELEVISION BAND BY THE LAND MOBILE SERVICES IN THE TOP TEN LAND MOBILE MARKETS

Victor Tawil, Gary Kalagian, and Robert Eckert Oct. 1983 44 p refs

(PB84-123116; FCC/OST/R83-3) Avail: NTIS HC A03/MF A01 CSCL 17B

The feasibility of further sharing of the UHF television band by land mobile services in the ten most congested land mobile markets is discussed. The Commission wished to determine the impact further sharing would have on the UHF-TV broadcast services in general, and on the new low power television service in particular. The analysis which was performed during the summer of 1982 with results as updated is given. The method is described in detail so that the analysis may be repeated in the future to assess the impact of any specific sharing proposals that may be made. GRA

N84-17471# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.

ATTENUATION OF MILLIMETER WAVES ON EARTH-SPACE PATHS BY RAIN CLOUDS

Kenneth C. Allen Aug. 1983 25 p refs

(Contract NTIA-910-8108)

(PB84-115120; NTIA/REPORT-83/132) Avail: NTIS HC A02/MF A01 CSCL 20N

A simple model of the attenuation of millimeter waves by precipitating liquid water clouds is presented. As frequency increases from the microwave band into the millimeter wave band, the model indicates a significant increase in the relative importance of the attenuation due to the suspended liquid water of cumulus clouds in comparison with that due to the rain produced by the clouds. For the upper portion of millimeter wave band, the cumulative distribution of attenuation due to rain is overshadowed by the attenuation due to clouds. The need for an adequate cloud model for the accurate prediction of Earth-space millimeter wave link performance is indicated. A short review of measurements of attenuation by clouds is presented for comparison with model predictions. Author (GRA)

N84-17472# Federal Communications Commission, Washington, D. C. Office of Plans and Policy.

IMPLEMENTING NEW TECHNOLOGY IN THE LAND MOBILE RADIO SERVICES Final Report

Philip B. Gieseler Sep. 1983 96 p

(PB84-101591) Avail: NTIS HC A05/MF A01 CSCL 17B

Three elements that provide a coherent structure for regulation of the land mobile radio service are shown, and recommendations that they be extended to frequency bands where they are not now used are made. A plan is presented for accomplishing this task. The use of experimental or developmental licenses is suggested as a means for further testing the feasibility of the plan. GRA

N84-17473# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.

A DIAGNOSTIC PROBE TO INVESTIGATE PROPAGATION AT MILLIMETER WAVELENGTHS

E. J. Violette, R. H. Espeland, and K. C. Allen Aug. 1983 42 p refs

(PB84-104223; NTIA/REPORT-83/128) Avail: NTIS HC A03/MF A01 CSCL 20N

A diagnostic probe used to fully describe the propagation characteristics of a millimeter wave channel by nearly simultaneous recording of an impulse response, frequency spectra, amplitude response, and bit error rate is discussed. A 30.3 GHz carrier accommodates the subcarriers and baseband modulation modes in a fully coherent network. Signal-to-noise determining components will permit BER performance of better than 10 to the minus 8 power at a 500 Mb/s rate with a 25 dB fade margin through a clear air 50 km distortion free path. Back to back operation of the terminals and a short atmospheric path is used to establish the reference performance level of the hardware. Controlled multipath tests are reported to demonstrate probe capabilities and to obtain reference data to better classify the fades and resulting distortion which occur on terrestrial links at millimeter wavelengths. GRA

N84-17474# Federal Communications Commission, Washington, D. C. Technical Analysis Div.

AMPLITUDE COMPANDORED SIDEBAND COMPARED TO CONVENTIONAL FREQUENCY MODULATION FOR VHF MOBILE RADIO: LABORATORY AND FIELD TESTING RESULTS

R. Haller and H. VanDeursen Oct. 1983 106 p

(PB84-116383; FCC/OST/TM-83-7) Avail: NTIS HC A06/MF A01 CSCL 17B

Amplitude Compandored Single Sideband (ACSB) communications systems need only 5 or 6 kHz of bandwidth to transmit information as compared to the 25 or 30 kHz needed by conventional FM two-way systems. Even though less bandwidth is needed for transmission, several questions needed to be answered regarding how ACSB might interfere with existing FM systems and the frequency reuse potential of ACSB as compared to FM. Answer to these questions could help in considering how new techniques, such as ACSB, might be introduced into the existing two-way VHF bands with minimum impact on current radio users and a long-term improvement in spectrum utilization. The report describes the testing program and provides a tabulation of the results. ACSB has been found to be a viable communications medium that can compare favorably to FM under most conditions. GRA

N84-17475# Institute for Telecommunication Sciences, Boulder, Colo.

CLIMATOLOGICAL COEFFICIENTS FOR RAIN ATTENUATION AT MILLIMETER WAVELENGTHS

E. J. Dutton, C. E. Lewis, and F. K. Steele Aug. 1983 35 p refs

(PB84-104272; NTIA/REPORT-83/129) Avail: NTIS HC A03/MF A01 CSCL 20N

It is demonstrated that most of the classical raindrop-size distribution formulations give inconsistent results when used to calculate specific attenuations at millimeter-wave frequencies. For this reason, it was decided it might be desirable to subcategorize drop-size distributions on the basis of large-scale worldwide climatological zones. This was done in the belief that different distribution will be needed in different environments to produce more accuracy in predicting millimeter-wave rain attenuation for a given location. Raindrop-size data taken over a span of about 40 years in various climatic zones are discussed briefly in terms of common characteristics. Some empirical methods of drop-size distribution measurements are discussed, and 226 drop-size distributions are grouped broadly into four climatic zones and presented in terms of well-known model drop-size distribution formulation. GRA

N84-17235*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ADAPTIVE MICROWAVE REFLECTOR
J. W. Goslee *In its* STEP Expt. Requirements Jan. 1984 p 325-331 ref (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 20N

N84-17236*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MICROWAVE REFLECTOR CHARACTERIZATION USING SIMPLE INSTRUMENTS IN EVA
J. W. Goslee *In its* STEP Expt. Requirements Jan. 1984 p 333-338 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 20N

N84-17237*# Department of Communications, Ottawa (Ontario). Directorate of Space Mechanics.
FLIGHT TEST OF A SYNTHETIC APERTURE RADAR ANTENNA USING STEP
D. G. Zimcik, F. R. Vigeron, and S. Ahmed *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 339-354 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 17I

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N84-17476# Overseas Relations Branch Translation Service, London (England).
OPTIMIZATION OF THE PARAMETERS OF THE ARC SUPPRESSING SYSTEM OF HIGH-VOLTAGE APPARATUSES WITH A THYRISTOR ATTACHMENT
N. M. Adonev, G. A. Kukekov, K. N. Vaserina, V. P. Lunin, and V. Ya. Frolov 20 Nov. 1983 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Elektromekhan. (USSR), no. 3, 1981 p 300-302
(BLL-OA-Trans-3139-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

The results are presented of investigations into the transition of current from the arc being suppressed to a thyristor branch which were carried out on models of the blow-out circuit with one-side blow-out; the optimum conditions of the interaction of the thyristor attachment with the contact circuit of the apparatus were determined; analytical equations describing the maximum rate of increase of current through semiconductor devices and the duration of the transient process, obtained using the volt-ampere characteristics of the electric arc and thyristors, are presented. B.W.

N84-17477*# TRW Electronic Systems Group, Redondo Beach, Calif.
THE 20 GHz SPACECRAFT FET SOLID STATE TRANSMITTER Final Report
Jul. 1983 181 p refs
(Contract NAS3-22503)
(NASA-CR-168240; NAS 1.26:168240) Avail: NTIS HC A09/MF A01 CSCL 09A

The engineering development of a solid state transmitter amplifier operating in the 20 GHz frequency band using GaAs field effect transistors (FETs) was detailed. The major efforts include GaAs FET device development, single-ended amplifier stage, balanced amplifier stage, cascaded stage and radial combiner designs, and amplifier integration and test. A multistage GaAs FET amplifier capable of 8.2 W CW output over the 17.9 to 19.1 GHz frequency band was developed. The GaAs FET devices developed represent state of the art FET power device technology. Further device improvements are necessary to increase the bandwidth to 2.5 GHz, improve dc-to-RF efficiency, and increase power capability at the device level. Higher power devices will simplify the amplifier combining scheme, reducing the size and weight of the overall amplifier. Author

N84-17478*# College of William and Mary, Newport News, Va.
AN EXPERIMENTAL INVESTIGATION OF ELECTRIC FLASHOVER ACROSS SOLID INSULATORS IN VACUUM Final Contractors Report, Mar. 1983 - Feb. 1984
Hans C. vonBaeyer 8 Feb. 1984 27 p refs
(Grant NAG1-332)
(NASA-CR-175379; NAS 1.26:175379) Avail: NTIS HC A03/MF A01 CSCL 09C

The insulation of high voltage conductors often employs solid insulators for many applications. In such applications, an unexpected electric flashover may occur along the insulator surface. Under conditions of high vacuum, the flashover voltage across the insulator is observed to be lower compared with that of the same electrode separation without an insulator. The reason for such an extreme reduction of flashover voltage is not well understood. Several models based on the secondary electron emission, were proposed to explain the onset of the surface flashover. The starting point and the developing velocity of the surface flashover were determined. An intensified image converter camera was used to observe the initial stage of electrical flashover along the insulator surface parallel to the electric field. Several different insulator materials were used as test pieces to determine the effect of the dielectric constant on the flashover voltage characteristics. Author

N84-17479*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A MATHEMATICAL MODEL FOR THE DOUBLY-FED WOUND ROTOR GENERATOR, PART 2
Frank J. Brady 1984 8 p ref Proposed for presentation at the Summer Meeting of the Power Eng. Soc., Seattle, 15-20 Jul. 1984; sponsored by IEEE
(Contract DE-AI01-76ET-20320)
(NASA-TM-83581; DOE/NASA/20320-57-Pt-2; E-1972-Pt-2; NAS 1.15:83581) Avail: NTIS HC A02/MF A01 CSCL 09A

A mathematical analysis of a doubly-fed wound rotor generator is presented. The constraints of constant stator voltage and frequency to the circuit equations were applied and expressions for the currents and voltages in the machine obtained. The derived variables are redefined as direct and quadrature components. In addition, the apparent (complex) power for both the rotor and the stator are derived in terms of these redefined components. S.L.

N84-17480*# TRW Electronic Systems Group, Redondo Beach, Calif. Military Electronics Div.
V-BAND INTEGRATED QUADRIPHASE MODULATOR Final Report, 23 Sep. 1981 - 25 Apr. 1983
A. Grote and K. Chang Nov. 1983 82 p refs
(Contract NAS5-26725)
(NASA-CR-175159; NAS 1.26:175159) Avail: NTIS HC A05/MF A01 CSCL 09C

A V-band integrated circuit quadriphase shift keyed modulator/exciter for space communications systems was developed. Intersatellite communications systems require direct modulation at 60 GHz to enhance signal processing capability. For most systems, particularly space applications, small and lightweight components are essential to alleviate severe system design constraints. Thus to achieve wideband, high data rate systems, direct modulation techniques at millimeter waves using solid state integrated circuit technology are an integral part of the overall technology developments. S.L.

N84-17481*# Hughes Research Labs., Malibu, Calif.
THE 25 kW RESONANT dc/dc POWER CONVERTER Final Report, 28 Sep. 1981 - 28 Oct. 1983
R. R. Robson Sep. 1983 147 p refs
(Contract NAS3-23159)
(NASA-CR-168273; NAS 1.26:168273) Avail: NTIS HC A07/MF A01 CSCL 09C

The feasibility of processing 25-kW of power with a single, transistorized, series resonant converter stage was demonstrated by the successful design, development, fabrication, and testing of such a device which employs four Westinghouse D7ST transistors in a full-bridge configuration and operates from a 250-to-350 Vdc input bus. The unit has an overall worst-case efficiency of 93.5% at its full rated output of 1000 V and 25 A dc. A solid-state dc input circuit breaker and output-transient-current limiters are included in and integrated into the design. Full circuit details of the converter are presented along with the test data. Author

N84-17482# Materials Research Labs., Melbourne (Australia).
EXPERIMENTAL ELECTROMAGNETIC LAUNCHERS AT MRL
A. J. Bedford, G. A. Clark, and Y.-C. Thio Aug. 1983 28 p refs
(MRL-R-894; AR-003-307) Avail: NTIS HC A03/MF A01

The design and construction of small caliber rail-type electromagnetic launchers are described. Bore sizes of 48 sq mm or 100 sq mm cross section are used and barrel lengths vary from 200 mm to 2 m. Sufficient information is provided to reproduce any of the devices, all of which are proving to be very useful experimentally. Examples of results are presented. Author

N84-17483# Texas Instruments, Inc., Dallas.
GaAs FET LOGIC AT LOW TEMPERATURES Final Technical Report, 1 Sep. 1979 - 31 Aug. 1982
M. R. Namordi, W. A. White, and F. H. Doerbeck Aug. 1983 76 p
(Contract N00014-79-C-0789; F62-582)
(AD-A135007; TI-CRL-08-83-40) Avail: NTIS HC A05/MF A01 CSCL 09/1

This report covers progress made to investigate the speed advantage associated with the operation of GaAs integrated circuits at low temperatures (77 K). The work was carried out in conjunction with a TI internally-funded program to develop a viable, room-temperature, high-speed GaAs logic technology. In Section 2, material development is discussed. Process development and circuit development are discussed in Sections 3 and 4, respectively. The principal results of this investigation, the temperature characteristics of GaAs MESFET devices and circuits, are described in Section 5. GRA

N84-17484# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Electrical Computer and Systems Engineering.
SIMPLY INSTRUMENTABLE AND OPTIMAL DIGITIZATION OF ANALOG INFORMATION SOURCES Annual Report, 30 Jun. 1982 - 29 Jun. 1983
W. A. Pearlman 29 Jun. 1983 13 p
(Grant AF-AFOSR-0188-81; AF Proj. 2304)
(AD-A135124; AFOSR-83-0967TR) Avail: NTIS HC A02/MF A01 CSCL 09/4

This document reports progress on Simply Instrumentable and Optimal Digitization of Analog Information Sources. New techniques for encoding sources with and without memory are described in Section 1 and the papers, presentations, and theses supported by the research are listed in Section 2. Three new optimal coding methods, generalizing previous ones, have been discovered for stationary Gaussian sources and the squared-error distortion measure. These methods, which store codewords on trees and trellises and utilize systematic search algorithms, are being applied to actual speech and image data. Also, the code storage requirements are not large, as this research has shown that small code letter alphabets give nearly optimal results. (Authors) GRA

N84-17485# Notre Dame Univ., Ind. Dept. of Electrical Engineering.
REAL-TIME IMPLEMENTATION OF A SPEECH DIGITIZATION ALGORITHM COMBINING TIME-DOMAIN HARMONIC SCALING AND ADAPTIVE RESIDUAL CODING, VOLUME 1 Final Report, Feb. 1982 - May 1983
James L. Melsa, James D. Mills, and Arvind A. Arora Jun. 1983 189 p 2 Vol.
(Contract DCA100-82-C-0026)
(AD-A135232) Avail: NTIS HC A09/MF A01 CSCL 09/4

This report describes the results of a fifteen-month study of the real-time implementation of algorithm combining time-domain harmonic scaling and Adaptive Residual Coding at a transmission bit rate of 16 kb/s. The modifications of this encoding algorithm as originally presented by Melsa and Pande to allow real-time implementation are described in detail. A non real-time FORTRAN simulation using a sixteen-bit word length was developed and tested to establish feasibility. The hardware implementation of a full-duplex, real-time system has demonstrated that this algorithm is capable of producing toll quality speech digitization. This report has been divided into two volumes. The first volume discusses the algorithm modifications and FORTRAN simulation. The details of the hardware implementation, schematics for the system and operating instructions are included in Volume 2 of this final report. GRA

N84-17486# Notre Dame Univ., Ind. Dept. of Electrical Engineering.
REAL-TIME IMPLEMENTATION OF A SPEECH DIGITIZATION ALGORITHM COMBINING TIME-DOMAIN HARMONIC SCALING AND ADAPTIVE RESIDUAL CODING, VOLUME 2 Final Report, Feb. 1982 - May 1983
James L. Melsa, James D. Mills, and Arvind A. Arora Jun. 1983 130 p 2 Vol.
(Contract DCA100-82-C-0026)
(AD-A135233) Avail: NTIS HC A07/MF A01 CSCL 09/2

This report describes the results of a fifteen month study of the real-time implementation of an algorithm combining time-domain harmonic scaling and Adaptive Residual Coding at a transmission bit rate of 16 kb/s. The modifications of this encoding algorithm as originally presented by Melso and Pande to allow real-time implementation are described in detail. A non real-time FORTRAN simulation using a sixteen-bit word length was developed and tested to establish feasibility. The hardware implementation of a full-duplex, real-time system has demonstrated that this algorithm is capable of producing toll quality speech digitization. This report has been divided into two volumes. The second volume discusses details of the hardware implementation, schematics for the system and operating instructions. GRA

N84-17487# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
BASIC AND APPLIED RESEARCH IN THE FIELD OF ELECTRONICS AND COMMUNICATIONS Final Report, 1 Jun. 1980 - 31 Oct. 1982
J. Allen Nov. 1983 28 p
(Contract DAAG29-80-C-0104)
(AD-A135283; ARO-17209.59-EL) Avail: NTIS HC A03/MF A01 CSCL 09/3

This report summarizes research accomplishments for the period June 1, 1980 through October 31, 1982. The Joint Services Electronics Program at MIT brings together faculty in Electrical Engineering, Physics and Chemistry to work on fundamental electronics-related processes. Research is organized in seven work units entitled Picosecond Optics, Chemical Dynamics, Surface Physics and Phase Transitions, Applied Optics, Atomic and Molecular Physics, Submicrometer Artificial microstructures and Applications, and Electromagnetics. GRA

N84-17488# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
RESEARCH LABORATORY OF ELECTRONICS Annual Progress Report, 1 Jan. - 31 Dec. 1982
J. Allen Jan. 1983 244 p
(AD-A135319; APR-125) Avail: NTIS HC A11/MF A01 CSCL 09/3

Partial Contents: Molecule Microscopy; Semiconductor Surface Studies; Atomic Resonance and Scattering; Reaction Dynamics at Semiconductor Surfaces; X-Ray Diffuse Scattering; Phase Transition in Chemisorbed Systems; Optics and Quantum Electronics; Photonics; Optical Spectroscopy of Disordered Materials and X-Ray Scattering from Surfaces; Infrared Nonlinear Optics;

Quantum Optics and Electronics; Microwave and Millimeter Wave Techniques; Microwave and Quantum Magnetics; Radio Astronomy; Electromagnetic Wave Theory and Remote Sensing; Electronic Properties of Amorphous Silicon Dioxide; Photon Correlation Spectroscopy and Applications; Submicron Structures Fabrication and Research; Plasma Dynamics; Optical Propagation and Communication; Digital Signal Processing Group; Speech Communication; Linguistics; Cognitive Information Processing; Custom Integrated Circuits; Communications Biophysics; and Physiology. GRA

N84-17489# Michigan Univ., Ann Arbor. Electron Physics Lab.
OPTIMUM DESIGN OF MILLIMETER-WAVE IMPATT DIODE OSCILLATORS
Y. S. Hwang Oct. 1983 159 p
(Contract DAAG29-82-K-0083)
(AD-A135335; TR-165; 019795-1-T; ARO-18619.1-EL) Avail: NTIS HC A08/MF A01 CSCL 09/5

The limitations and control of pulsed IMPATT diode millimeter-wavelength oscillators are described. A quasi-static oscillator model is established for characterizing amplitude and frequency behavior during pulsed operation in response to external influences such as bias current, temperature, optical injection, locking signal injection and RF circuit. The effect of these external parameters in oscillator turn-on, turn-off, frequency chirp during the pulse, and start-up jitter are given for a millimeter-wavelength oscillator using a Si double-drift diode. Methods of controlling the pulsed behavior including bias current compensation, optical compensation and injection locking are analyzed and applied to a pulsed millimeter-wave oscillator example. The optimum bias current and optical current waveforms which eliminate post turn-on frequency drift are presented. Author (GRA)

N84-17490# North Carolina Univ., Raleigh. Dept. of Electrical Engineering.
HETEROJUNCTION SOLID-STATE DEVICES FOR MILLIMETER-WAVE SOURCES Final Report, 1 Sep. 1980 - 31 Aug. 1983
R. J. Trew Oct. 1983 167 p
(Contract DAAG29-80-K-0080)
(AD-A135389; ARO-16859.19-EL) Avail: NTIS HC A08/MF A01 CSCL 09/1

The use of compound semiconductor and heterojunction devices as millimeter-wave sources through 100 GHz has been investigated. Both IMPATT and MESFET type devices have been considered. A series of comprehensive and accurate theoretical device models have been developed and utilized in this investigation. Both equilibrium and nonequilibrium transport effects have been investigated. Prototype IMPATT device structures have been fabricated in GaAs and GaInAs/InP. Author (GRA)

N84-17491# California Univ., Berkeley. Electronics Research Lab.
VLSI RESEARCH Semiannual Technical Research and Development Status Report
R. W. Brodersen 30 Sep. 1983 14 p
(Contract N00039-81-K-0251; ARPA Order 4031)
(AD-A134628) Avail: NTIS HC A02/MF A01 CSCL 09/5

Contents: Second Generation; Architecture Software Prototyping; Multiprocessor Circuit Simulation; Novel, High-Performance Architectures; Speech Recognition; Macrocells for Signal Processing; Research in Circuit Simulation and Layout; New VLSI Tools Distribution; Berkeley Advanced CMOS; and Technology. B.G.

N84-17492# Litton Systems, Inc., Woodland Hills, Calif. Guidance and Control Systems Div.
RUBIDIUM FREQUENCY STANDARD STUDY Final Technical Report, Feb. 1982 - Mar. 1983
T. M. Kwon, B. C. Grover, and H. E. Williams Oct. 1983 124 p
(Contract F19628-83-C-0046; AF Proj. 2277)
(AD-A134713; RADC-TR-83-230) Avail: NTIS HC A06/MF A01 CSCL 09/5

The primary objectives of this contract were to design a physics package and to characterize the voltage controlled crystal oscillator (VCXO), which will satisfy the temperature and vibration requirements of a tactical rubidium frequency standard unit (FSU). The double buffer gas resonance cell has demonstrated temperature performance that exceeds the requirement. Vibration sensitivities of a FSU have been analyzed. Improved FSU design under the tactical vibration inputs are discussed in detail with performance predictions. Experimental results are shown to demonstrate validity of the predictions. The SC-cut VCXO, the state-of-the-art, provides realistic potential for use in tactical FSU. Author (GRA)

N84-17493# Naval Research Lab., Washington, D. C.
ADAPTIVE FEEDFORWARD LINEAR WIDEBAND HF POWER BANK Interim Report
D. C. Andrews, E. E. Barr, T. E. Olver, and B. S. Abrams 31 Aug. 1983 42 p
(NRL Proj. 212-22)
(AD-A134744; AD-E000548; NRL-8710) Avail: NTIS HC A03/MF A01 CSCL 09/5

To fulfill modern naval command, control, and communication requirements, a new, wideband, high frequency (HF) communications system is being developed that is characterized by the complete removal of high power switching and tuning and that uses adaptive cancellation techniques in transmitting subsystem to suppress unwanted radiation of noise and distortion. The report focuses on the development of an unusually linear 500-W power amplifier and describes techniques that have been applied to further reduce noise and distortion product generation by means of iterated feedforward cancellation stages. Although three stages have been planned, only two have been implemented. To minimize power handling and distortion requirements of the auxiliary feedforward amplifiers, adaptively controlled weights are used to augment nonadaptive equalizers in the cancellation of fundamental energy for each stage. Performance measurements verifying the concept are presented, and various practical limitations are described. Intermodulation distortion to signal ratios of greater than -86 dBc have been achieved with the amplifier delivering two 100-W fundamental signals. GRA

N84-17494# Stanford Univ., Calif. Dept. of Electrical Engineering and Computer Sciences.
RESEARCH IN VLSI SYSTEMS. HEURISTIC PROGRAMMING PROJECT AND VLSI THEORY PROJECT. A FAST TURN AROUND FACILITY FOR VERY LARGE SCALE INTEGRATION (VLSI) Technical Status Report, May - Nov. 1983
J. Hennessy, R. Matthews, J. Newkirk, J. Shott, J. D. Ullman, and H. Brown Nov. 1983 42 p
(Contracts MDA903-83-C-0335; MDA903-80-C-0107; MDA903-80-C-0432; MDA903-79-C-0680)
(AD-A134809) Avail: NTIS HC A03/MF A01 CSCL 09/1

This report summarizes progress in the DARPA funded VLSI Systems Research Projects from May 1983 to November 1983, inclusive. The major areas under investigation have included: analysis and synthesis design aids, applications of VLSI, special purpose chip design, VLSI computer architectures, signal processing algorithms and architectures, reliability studies, hardware specification and verification, VLSI theory, and VLSI fabrication. The major research problems are introduced and progress is discussed; the Appendix contains a list of published research papers from these projects. Author (GRA)

N84-17495# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
RLE (RESEARCH LABORATORY OF ELECTRONICS) Progress Report, 1 Jan. - 31 Dec. 1982
J. Allen Jan. 1983 231 p
(AD-A134812; PR-125) Avail: NTIS HC A11/MF A01 CSCL 05/2

Topics being studied at the Massachusetts Institute of Technology's Research Laboratory of Electronics are discussed. Among the topics discussed are: Molecule Microscopy; Semiconductor Surface Studies; Atomic Resonance and Scattering; Reaction Dynamics at Semiconductor Surfaces; X-Ray Diffuse Scattering; Phase Transitions in Chemisorbed Systems; Optics and Quantum Electronics; Photonics; Optical Spectroscopy of Disordered

Materials and X-ray Scattering from Surfaces; Infrared Nonlinear Optics; Quantum Optics and Electronics; Microwave and Millimeter Wave Techniques; Microwave and Quantum Magnetics; Radio Astronomy; Electromagnetic Wave Theory and Remote Sensing; Electronic Properties of Amorphous Silicon Dioxide; Photon Correlation Spectroscopy and Applications; Submicron Structures Fabrication and Research; Plasma Dynamics; Optical Propagation and Communication; Digital Signal Processing Group; Speech Communication; Linguistics; Custom Integrated Circuits; Communications Biophysics; and Physiology. GRA

N84-17496# Johns Hopkins Univ., Baltimore, Md. Dept. of Electrical Engineering and Computer Science.
ANALYSIS OF AN ERROR DETECTION SCHEME FOR PARALLEL COMPUTATIONS
G. G. L. Meyer and H. L. Weinert 15 Nov. 1983 21 p
(Contract N00014-81-K-0813)
(AD-A134819; JHU/EECS-83/14) Avail: NTIS HC A02/MF A01 CSCL 09/4

In this document the authors determine the conditions under which an error detection scheme based on strict redundancy can be used to increase confidence in the results of parallel computations. This study shows that the issues of speed and reliability of parallel processors are interdependent and must be considered jointly at the design stage. GRA

N84-17497# Utah Univ., Salt Lake City. Dept. of Physics.
ELECTRODE NOISE IN BETA ALUMINAS Interim Technical Report
J. J. Brophy and S. W. Smith Nov. 1983 25 p
(Contract N00014-82-K-0603)
(AD-A134837; TR-2) Avail: NTIS HC A02/MF A01 CSCL 09/1

Conductivity fluctuations in the fast ionic conductors sodium and silver Beta alumina ceramic have been observed for the first time in research supported under Contract No. N00014-82-K-0603. The phenomena is not masked by contact noise effects and, indeed, contact current noise itself yields useful experimental data. Noise spectra suggesting relaxation and diffusion processes are found both in the bulk and at the electrodes. This proposal describes a continuation of the research effort which enables a more quantitative interpretation of experimental results in terms of transport properties of the model ions. The approach includes study of single crystal samples, as well as extension of these new experimental techniques to other fast ionic conductors such as silver iodide and conducting polymers. One phase of the proposed effort concentrates on the study of molten sodium electrodes to sodium Beta alumina ceramics under destructive breakdown conditions. GRA

N84-17498# Naval Surface Weapons Center, White Oak, Md.
AN ACTIVE FILTER PRIMER Final Report
Arthur D. Delagrange 1 Feb. 1983 133 p
(AD-A134838; NSWC/TR-82-552) Avail: NTIS HC A07/MF A01 CSCL 09/5

In the past few years active filters have become very popular. This report explains why, and explains what active filters can (and can't) do. It gives the basics of active filter design, both theory and practice. It can be used as a handbook to build working active filters of the most common types. This report is an update of the original issued in 1979. Author (GRA)

N84-17499# Ballistic Research Labs., Aberdeen Proving Ground, Md. Ballistic Research Lab.
THERMAL-ENERGY TRANSPORT FROM ARC TO RAILS IN AN ARC-DRIVEN RAIL GUN
J. D. Powell Oct. 1983 39 p
(DA Proj. 1L1-62603-AH-18)
(AD-A134991; AD-F300347; ARBRL-TR-02530) Avail: NTIS HC A03/MF A01 CSCL 19/6

A model is developed for examining thermal-energy transfer from the arc to the rails in an arc-driven rail gun. Resistive heating within the rails is also accounted for, though the contribution to the rail temperature from this mechanism is frequently negligible. Melting of the rail surface is allowed in the model, but it is assumed that the melted material is swept away and absorbs no further energy. A set of differential equations is derived which, when solved, yield the temperature, magnetic induction, and current density within the rail, as well as the mass lost from the rail surface. Both numerical and limiting-case analytic solutions to the equations are presented, and approximate expressions are obtained for the time to melting and the steady-state melting velocity of the rail surface. It is found that the governing equations can be written in a form so that they depend only on experimentally measured properties of the arc. The model is then used to analyze rail melting in a recent experiment by Jamison and Burden, for which these properties have been obtained. It is also used to estimate rail damage in other experiments by using arc properties calculated in our previous work. Considerable discussion is given of the probable sources of error in the calculation and recommendations for improvements in future work are made. GRA

N84-17500# Sandia Labs., Albuquerque, N. Mex.
THEORY OF DYNAMIC FERROELECTRICITY
Peter J. Chen 1983 11 p refs Presented at the Wave Phenomena Conf., Toronto, 1 Jun. 1983
(Contract DE-AC04-76DP-00789)
(DE84-002609; SAND-83-0429C; CONF-8306143-1) Avail: NTIS HC A02/MF A01

A dynamical theory of ferroelectricity is presented. The theory considers the transient effects due to domain switching and dipole dynamics. A specific representation is derived for departures from the virgin state which is taken to be a natural reference state, and allows for changes in material symmetry due to domain switching and dipole dynamics. DOE

N84-17501# California Univ., Livermore. Lawrence Livermore Lab.
INEXPENSIVE SOLID-STATE TRIGGER UNIT FOR THYRATRONS
E. Steve Fulkerson Jun. 1983 5 p refs Presented at the IEEE Power Electron. Spec. Conf., Albuquerque, N. Mex., 6-8 Jun. 1983
(Contract W-7405-eng-48)
(DE84-001424; UCRL-88672; CONF-830621-45) Avail: NTIS HC A02/MF A01

An SCR based unit suitable for triggering thyratrons was developed. It is capable of developing over a kilovolt peak into a 50 ohm load with a risetime of under ten nanoseconds. Both grounded grid and common cathode styles of thyratrons may be driven with minor circuit changes. Jitter characteristics show less than half a nonsecond peak to peak, and a standard deviation less than 100 picoseconds has been obtained. DOE

N84-17502# Argonne National Lab., Ill. Components Technology Div.
STATE-OF-THE-ART OF SOLID-STATE MOTOR CONTROLLERS. PART 4: FAILURE-RATE AND FAILURE-MODE DATA Interim Report
R. A. Jaross Sep. 1983 26 p refs
(Contract W-31-109-eng-38)
(DE84-001022; ANL-CT-83-6) Avail: NTIS HC A03/MF A01

The reliability of solid state motor controllers for nuclear power plants was assessed. Available data on failure rate and failure mode data for solid state motor controllers based on industrial operating experience is meager; the data are augmented by data on other solid state power electronic devices which have components similar to those found in solid state motor controllers. In addition to large nonnuclear solid state adjustable speed motor drives, the reliability of nuclear plant inverter systems and high voltage solid state dc transmission line converters is assessed. The reliability of solid state devices typical of those expected to be used in nuclear power plants in terms of failures per hour are determined. DOE

N84-17503# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.

TRANSMISSION LINE TRANSFORMERS; THEORY AND DESIGN DATA
Aake Bergquist May 1983 19 p refs In SWEDISH; ENGLISH summary
(FOA-C-30327-E; ISSN-0347-3708) Avail: NTIS HC A02/MF A01; Research Inst. of National Defence, Stockholm KR 50

The fundamental theory, and calculated values of the reflection coefficient of transformers of different impedance variations, are presented. An exponential impedance variation allows a short-type construction, with a narrow bandwidth, while the linear variation has the advantage of a simple design. The best transmission line transformers use cos-exp- or triangular-g(x)- variations.
Author (ESA)

N84-17504# Varta Batterie A.G., Kelkheim (West Germany). Ressort Forschung und Entwicklung.
DEVELOPMENT OF A MODULAR BATTERY Final Report, Sep. 1979
Hans K. Koethe Bonn Bundesministerium fuer Forschung und Technologie Oct. 1983 104 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-83-021; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22

Over 90 hermetically sealed Nickel-Cadmium cells for use in space missions were manufactured and 16 cells, randomly chosen, were submitted to a high mechanical stress level test. A battery module of 24 cells was developed. The mechanical test procedures applied to this module were chosen to meet the requirements of the launcher Ariane. A cold plate temperature range from -10 C to +30 C was required. Tests were performed on 3 modules. Test results are positive for both battery types.
Author (ESA)

N84-17505# United Kingdom Atomic Energy Authority, Harwell (England). Instrumentation and Applied Physics Div.
EFFECTS OF SPACE RADIATION ON ADVANCED SEMICONDUCTOR DEVICES. PART 1: A REVIEW OF CURRENT THEORIES AND PRACTICE IN COSMIC RAY SIMULATION Interim Report
T. K. Sanderson, D. Mapper, and J. H. Stephen Paris ESA Dec. 1982 78 p refs 2 Vol.
(Contract ESA-4963/81/NL-MS)
(G-2532-Vol-1; ESA-CR(P)-1801-Vol-1) Avail: NTIS HC A05/MF A01

Literature on the effects of cosmic rays and other types of space radiation on VLSI circuitry was reviewed. It is found that single event upsets in advanced memory and logic devices, due to cosmic rays, are a major cause of concern to the aerospace community. The general effects of space radiation on VLSI circuitry are discussed and the testing methodology is reviewed. The importance of soft error testing to the European space community is considered, and a program of work is recommended. A simulation of cosmic ray induced soft errors using a variable energy cyclotron to accelerate heavy ions is proposed.
Author (ESA)

N84-17506# United Kingdom Atomic Energy Authority, Harwell (England). Instrumentation and Applied Physics Div.
EFFECTS OF SPACE RADIATION ON ADVANCED SEMICONDUCTOR DEVICES. PART 2: COSMIC RAY SIMULATION EXPERIMENTS FOR THE STUDY OF SINGLE EVENT UPSETS IN CMOS TECHNOLOGY Final Report
T. K. Sanderson, D. Mapper, J. H. Stephen, and J. Farren Paris ESA May 1983 43 p refs 2 Vol.
(Contract ESA-4963/81/NL-MS)
(G-2745-Vol-2; ESA-CR(P)-1801-Vol-2) Avail: NTIS HC A03/MF A01

Cosmic ray induced single event upsets were simulated using cyclotron-produced heavy ions and fission fragments from a 252Cf source. Commercial memories manufactured by Harris, Fujitsu and Toshiba were delidded and irradiated under vacuum. A laboratory heavy ion test system based on a I mu Ci 252Cf source was developed. The spontaneous fission fragments are high energy heavy ions with mean masses of 108.39 and 143. 61 amu and mean energies of 105.71 and 80.01MeV respectively. These particles readily produced upsets in all of the devices examined and latch-up in the commercial Harris RAMs. Mean single event upset cross sections of 0.0085, 0.0077 0.013 cm sq are obtained for Harris HM6504-9, Fujitsu MB8404E and Toshiba TC5504AD-3 devices respectively.
Author (ESA)

N84-17507# MATRA Service Aerodynamique, Toulouse (France).
PREPARATION OF STANDARD ELECTRICAL TESTABILITY PROVISIONS FOR SPACE EQUIPMENT. VOLUME 1: EXECUTIVE SUMMARY
C. Vialet, J. F. Poussin, F. Marsal, and J. P. Ruffie Paris ESA Jul. 1983 54 p refs 2 Vol.
(Contract ESA-4820/81/NL-PP(SC))
(DM.51/CV/JP/327.83-Vol-1; ESA-CR(P)-1813-Vol-1) Avail: NTIS HC A04/MF A01

The requirements for standard electrical testability provisions for space equipments are established, in order to promote their reusability. The advantages of automatic tests and of the use of standard test data buses with high level test programming languages are highlighted. Equipment test provisions must be met in a unified test concept, applied when writing specifications. Methods of electrically interfacing the equipment with the proposed test system are discussed, and it is shown that using standard functional interfaces and advanced VLSI circuits provides substantial benefits. A modular approach is recommended so that only the test provisions which are necessary for a given mission are implemented in the equipment.
Author (ESA)

N84-17508# MATRA Service Aerodynamique, Toulouse (France).
PREPARATION OF STANDARD ELECTRICAL PROVISIONS FOR SPACE EQUIPMENTS Final Report
C. Vialet, J. F. Poussin, F. Marsal, and J. P. Ruffie Paris ESA Mar. 1983 155 p 2 Vol.
(Contract ESA-4820/81/NL-PP(SC))
(DM.51/CV/JP/327.83-Vol-2; ESA-CR(P)-1813-Vol-2) Avail: NTIS HC A08/MF A01

The requirements for standard electrical testability provisions for space equipments are established, in order to promote their reusability. The advantages of automatic tests and of the use of standard test data buses with high level test programming languages are highlighted. Equipment test provisions must be met in a unified test concept, applied when writing specifications. Methods of electrically interfacing the equipment with the proposed test system are discussed, and it is shown that using standard functional interfaces and advanced VLSI circuits provides substantial benefits. A modular approach is recommended so that only the test provisions which are necessary for a given mission are implemented in the equipment.
Author (ESA)

N84-17509# National Bureau of Standards, Washington, D.C.
DEVELOPMENT OF POWER SYSTEM MEASUREMENTS Quarterly Report, 1 Oct. - 31 Dec. 1982
R. E. Hebner, ed. Sep. 1983 42 p refs Sponsored in part by DOE
(PB84-109891; NBSIR-83-2755) Avail: NTIS HC A03/MF A01 CSCL 09A

The report emphasizes the calibration of instruments designed to measure the 60-Hz electric and magnetic fields in biological exposure facilities, the measurement of the rate of decomposition of SF6 in positive dc-corona discharges, and in the measurement of space charge in transformer oil between 100C and 150C.
Author (GRA)

N84-17510# National Bureau of Standards, Boulder, Colo. National Engineering Lab.
HANDBOOK FOR BROADBAND ISOTROPIC ANTENNA SYSTEM. VOLUME 1: OPERATION MANUAL
W. D. Bensema Jul. 1983 74 p 4 Vol.
(PB84-101948; NBSIR-1693-Vol-1) Avail: NTIS HC A04/MF A01

CSCL 09E

Equipment operation and maintenance procedures are described which support the broadband antenna system developed by the National Bureau of Standards to measure in the frequency range from 10 kHz to 18 GHz. The system uses isotropic broadband antennas, a low power microcomputer, antenna switching units, commercially available receivers, and associated cabling. The system automatically switches antenna elements, computes the total scalar sum of the existing field strength, and automatically logs time, frequency, signal strength, and system configuration. Advantages of the system include a reduction in the number of personnel required to make searches for EMI, and a mode for unmanned monitoring. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N84-17511 Academy of Sciences (USSR), Moscow. Space Research Inst.

ELECTRON ACCELERATION IN THE FRONT OF INTENSE COLLISIONLESS SHOCK WAVES

O. L. Vaisberg, A. A. Galeev, G. N. Zastenker, S. I. Klimov, M. N. Nozdrachev, R. Z. Sagdeev, A. Yu. Sokolov, and V. D. Shapiro 1983 26 p refs

(PR-813) Copyright. Avail: Issuing Activity

The magnetohydrodynamic analysis of the structure of intense shock waves propagating across the magnetic field in a collisionless plasma, showed that for Mach numbers higher than critical the wave profile overturns and a multivelocity ion stream forms. In the kinetic description it corresponds to the situation when part of the ions of the oncoming plasma flow is reflected from the electrical potential jump in the shock front. Direct measurements of plasma parameters and lower-hybrid oscillation intensity at the bow shock forming in the supersonic solar wind in front of the Earth magnetosphere, have confirmed that the mechanism of energy dissipation, sometimes accompanied by the anomalous ion-sound viscosity, is a basic mechanism in case of strong collisionless shock waves and may explain the observed ion thermalization behind the shock front. Author

N84-17512# Overseas Relations Branch Translation Service, London (England).

INFRARED HEATING

28 Nov. 1983 53 p refs Transl. into ENGLISH from the book "Elektrowaerme Theory and Practice" West Germany, 1974 p 698-744

(BLL-OA-Trans-3121-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

The transfer of energy by radiation whose limits lie between 1 mm and 400 mm is indicated. The radiation used lies practically completely in the infrared region. Its use therefore depends on the thermal radiation laws (black body or integral receiver laws). These laws were derived mathematically in accordance with the properties of an ideal body, the so-called "integral receiver" (formerly black body). According to definition this integral receiver has the property of absorbing completely all incident electromagnetic radiation. From these the following laws were deducted: (1) All bodies with a temperature above absolute zero emit a radiation. (2) The energy emitted by the integral receiver is proportional to the 4th power of the absolute temperature. (3) The emission theoretically comprizes the whole radiation. (4) The radiation comprizing the emission spectrum does not transport the same amount of energy at every wavelength. Author

N84-17513# British Library Lending Div., Boston Spa (England).

RULES GOVERNING THE DISTRIBUTION OF A GAS JET IN A LIQUID. COMMUNICATION 2

I. V. Belov, B. T. Belov, A. S. Noskov, and L. A. Smirnov [1983] 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR) p 90-92

(BLL-M-35437-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A procedure for calculating the velocity of gas and liquid and the gas content of the liquid from the results of measurements of flow densities in two phase gas liquid jets is proposed. It is found by way of the procedure that the profiles of the calculated quantities obtain their maximum on the jet axis and that there is a region of very low liquid content near the nozzle for incomplete expanded jets. E.A.K.

N84-17514 Overseas Relations Branch Translation Service, London (England).

HEAT PUMP UNITS WITH ELECTRICALLY DRIVEN COMPRESSORS FOR WATER HEATING

Jun. 1983 24 p Transl. into ENGLISH of rept. DIN-8947 German Standards Inst., Cologne, Jun. 1983

(BLL-OA-Trans-3181-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

The standards for heat pumps for drinking and service water heating with electrically driven compressors, including any existing supplementary electric heating units, requiring combination with a water storage tank and attaining a mixed water quantity at 40 C or a heat quantity of 5 kWh are given. The standard establishes concepts and requirements for performance as well as the tests and markings for the devices. Author

N84-17515 Iowa Univ., Iowa City.

FINITE ANALYTIC NUMERICAL SOLUTIONS OF LAMINAR AND TURBULENT CONVECTIVE HEAT TRANSFER FOR PIPE FLOW PAST A CAVITY Ph.D. Thesis

Young Hwan Yoon 1983 269 p

Avail: Univ. Microfilms Order No. DA8325195

Convective heat transfer for laminar and turbulent flow in a pipe through a cylindrical chamber with a sudden expansion and contraction is solved by the finite analytic numeric method. The chamber wall temperature is isothermal and lower than the uniform temperature at the pipe inlet. To predict the turbulent flow and heat transfer, the analysis employs a turbulence model with two differential turbulent transport equations for the turbulent kinetic energy, K, and the rate of turbulent dissipation epsilon. The finite analytic method differs from other numerical methods in that it utilizes a local analytic solution in an element to obtain algebraic representations of the governing partial differential equations. The finite analytic method is shown to provide accurate numerical solutions for Navier-Stokes and energy equations from low to high Reynolds number flow without using the upwind technique. Dissert. Abstr.

N84-17516 Iowa Univ., Iowa City.

SHAPE OPTIMAL DESIGN AND FREE BOUNDARY VALUE PROBLEMS Ph.D. Thesis

Jean-Win Hou 1983 139 p

Avail: Univ. Microfilms Order No. DA8325156

A unified formulation and efficient numerical technique is presented to perform shape optimal design. It is also shown that free boundary-value problems can be formulated and solved as shape optimal design problems. Although the former problem is a design problem and the latter is an analysis problem; in both cases it is the shape of the mechanical component or the free boundary that is directly treated as the unknown. Shape optimal design problems involving eigenvalues in a membrane and elastic bars in torsion are formulated and solved numerically to demonstrate that the unified scheme developed performs well. The utilization of a variational formulation for the state equations is important, since material derivatives can be employed to find the domain variation. An adjoint variable technique is then introduced to express gradients as functionals of the normal movement along the boundary. A linearization method of optimization and a sparse

matrix technique used in numerical calculation are also discussed. Dissert. Abstr.

N84-17517 California Inst. of Tech., Pasadena.
INTERACTION OF WEAK SHOCK WAVES AND DISCRETE GAS INHOMOGENEITIES Ph.D. Thesis
Jean-Francois Luc Haas 1984 240 p
Avail: Univ. Microfilms Order No. DA8325742

An experimental investigation of the interaction of shock waves with discrete gas inhomogeneities is conducted in the GALCIT 15 cm diameter shock tube. The gas volumes are cylindrical refraction cells of 5 cm diameter with a 0.5 micron thick membrane separating the test gas (helium or Freon 22) from the ambient air and large spherical soap bubbles containing the same gases. The incident wave Mach numbers are nominally 1.09 and 1.22. The wave pattern and the deformation of the gas volumes are documented by shadowgraphs. The transmitted and diffracted wave pressure profiles are recorded by pressure transducers at various distances behind the cylinders. The basic phenomena of acoustic wave refraction, reflection and diffraction by cylindrical acoustic lenses, with indices of refraction appropriate to the gases used in the experiments, are illustrated with computer-generated ray and wave-front diagrams. Dissert. Abstr.

N84-17518 State Univ. of New York, Buffalo.
EXPERIMENTAL INVESTIGATION OF THE TURBULENT AXI-SYMMETRIC JET Ph.D. Thesis
Steven Patrick Capp 1983 199 p
Avail: Univ. Microfilms Order No. DA8325048

The results of a study of the turbulent axisymmetric jet are presented. Data taken with a laser Doppler anemometer using the burst-processor technique is reported. Based upon a simple model for the back flow of a jet in a finite environment, it is concluded that the major source of error was the flow facility itself and not primarily the measurement technique utilized. The jet data is used to gain further insight into the appropriate methods for correctly utilizing the burst-processor. Following a brief description of hardware design and construction, the major difficulties in the implementation of counter measurements are reviewed. The concept of software verification is then introduced. The probability distribution function of the particle path length through the measuring volume is derived and its impact on verification techniques are explored. Procedures are described to give a rough guide for judging signal quality and particle seeding characteristics. Finally, a methodology is suggested for the programming of data acquisition routines. Dissert. Abstr.

N84-17519*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
PHOTODIAGNOSTICS OF TURBULENT FLOWS USING LASER-INDUCED FLUORESCENCE Final Report, 1 Oct. 1982 - 30 Sep. 1983
Daniel Bershader and Kenneth P. Gross Dec. 1983 32 p refs
(Contract NCC2-82)
(NASA-CR-166546; NAS 1.26:166546) Avail: NTIS HC A03/MF A01 CSCL 20D

An optical probe technique that will allow remote measurements of temperature (and density), along with their time dependent fluctuations, to be made in a supersonic turbulent wind tunnel flow was developed. Laser-induced fluorescence from nitric oxide which was seeded into the flowing gas medium (nitrogen) at low concentrations was used. The fluorescence emission intensity following laser excitation of the nitric oxide (NO) ground state rotational levels is then related to thermodynamic quantities of the bulk fluid. S.L.

N84-17520*# Cooper Union, New York.
A COMPREHENSIVE MODEL TO DETERMINE THE EFFECTS OF TEMPERATURE AND SPECIES FLUCTUATIONS ON REACTION RATES IN TURBULENT REACTION FLOWS Semiannual Status Report, 1 Aug. 1983 - 31 Jan. 1984
F. Magnotti, G. Diskin, J. Matulaitis, and W. Chinitz 31 Jan. 1984 107 p refs
(Grant NAG1-18)
(NASA-CR-175365; NAS 1.26:175365) Avail: NTIS HC A06/MF A01 CSCL 20D

The use of silane (SiH4) as an effective ignitor and flame stabilizing pilot fuel is well documented. A reliable chemical kinetic mechanism for prediction of its behavior at the conditions encountered in the combustor of a SCRAMJET engine was calculated. The effects of hydrogen addition on hydrocarbon ignition and flame stabilization as a means for reduction of lengthy ignition delays and reaction times were studied. The ranges of applicability of chemical kinetic models of hydrogen-air combustors were also investigated. The CHARNAL computer code was applied to the turbulent reaction rate modeling. B.G.

N84-17521*# California Inst. of Tech., Pasadena. Lab. for Seismology.
SHOCK WAVE PROPERTIES OF ANORTHOSITE AND GABBRO
Mark B. Boslough and Thomas J. Ahrens 1984 26 p refs
(Grant NGL-05-002-105)
(NASA-CR-173309; NAS 1.26:173309) Avail: NTIS HC A03/MF A01 CSCL 20D

Hugoniot data on San Gabriel anorthosite and San Marcos gabbro to 11 GPA are presented. Release paths in the stress-density plane and sound velocities are reported as determined from particl velocity data. Electrical interference effects precluded the determination of accurate release paths for the gabbro. Because of the loss of shear strength in the shocked state, the plastic behavior exhibited by anorthosite indicates that calculations of energy partitioning due to impact onto planetary surfaces based on elastic-plastic models may underestimate the amount of internal energy deposited in the impacted surface material. A.R.H.

N84-17522*# Northwestern Univ., Evanston, Ill.
THERMOCAPILLARY FLOWS AND THEIR STABILITY: EFFECTS OF SURFACE LAYERS AND COMBINATION Final Report
S. H. Davis and G. M. Homsy (Stanford Univ.) Jan. 1984 5 p refs
(Contract NAS8-33881)
(NASA-CR-170962; NAS 1.26:170962) Avail: NTIS HC A02/MF A01 CSCL 20D

The theoretical analysis of the fluid mechanics and heat transfer of motions driven by surface tension gradients (Marangoni convection) was researched. Convection accompanying the process of growing high quality single crystals from the melt in a micro-g environment was examined. The geometries considered include two dimensional liquid filled slots and axisymmetric float-zone configurations. Author

N84-17523*# Vought Corp., Dallas, Tex.
DEVELOPMENT OF A CONTACT HEAT EXCHANGER FOR A CONSTRUCTABLE RADIATOR SYSTEM
H. R. Howell 1 Jul. 1983 120 p refs
(Contract NAS9-14907)
(NASA-CR-171730; NAS 1.26:171730; REPT-2-53200/3R-53490)
Avail: NTIS HC A06/MF A01 CSCL 20D

A development program for a contact heat exchanger to be used to transfer heat from a spacecraft coolant loop to a heat pipe radiator is described. The contact heat exchanger provides for a connectable/disconnectable joint which allows for on-orbit assembly of the radiator system and replacement or exchange of radiator panels for repair and maintenance. The contact heat exchanger does not require the transfer of fluid across the joint; the spacecraft coolant loop remains contained in an all welded system with no static or dynamic fluid seals. The contact interface is also 'dry' with no conductive grease or interstitial material required. S.L.

N84-17524# Materials Research Labs., Melbourne (Australia).
LARGE AMPLITUDE WAVES GENERATED BY AN EXPLOSIVE MECHANISM
E. H. vanLeeuwen Nov. 1983 17 p refs

(MRL-R-905; AR-003-801) Avail: NTIS HC A02/MF A01

Wave propagation in the far field due to an underwater disturbance is discussed. The driving mechanism of the disturbance is taken to be a cylindrical volume of water projected vertically under the action of ordinary forces. Particular emphasis is placed on achieving a closed form solution to Laplace's equation. The asymptotic formulae of the surface displacement are derived in the limit as r, t to infinity, using the method of stationary phase. S.L.

N84-17525*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HOT-FLOW TESTS OF A SERIES OF 10-PERCENT-SCALE TURBOFAN FORCED MIXING NOZZLES

Verlon L. Head, Louis A. Povinelli, and William H. Gerstenmaier Jan. 1984 95 p refs

(NASA-TP-2268; E-1746; NAS 1.60:2268) Avail: NTIS HC A05/MF A01 CSCL 20D

An approximately 1/10-scale model of a mixed-flow exhaust system was tested in a static facility with fully simulated hot-flow cruise and takeoff conditions. Nine mixer geometries with 12 to 24 lobes were tested. The areas of the core and fan stream were held constant to maintain a bypass ratio of approximately 5. The research results presented in this report were obtained as part of a program directed toward developing an improved mixer design methodology by using a combined analytical and experimental approach. The effects of lobe spacing, lobe penetration, lobe-to-centerbody gap, lobe contour, and scalloping of the radial side walls were investigated. Test measurements included total pressure and temperature surveys, flow angularity surveys, and wall and centerbody surface static pressure measurements. Contour plots at various stations in the mixing region are presented to show the mixing effectiveness for the various lobe geometries. Author

N84-17526*# Massachusetts Inst. of Tech., Cambridge. Lab. for Computational Fluid Dynamics.

COMPUTATION OF POTENTIAL FLOWS WITH EMBEDDED VORTEX RINGS AND APPLICATIONS TO HELICOPTER ROTOR WAKES Final Report

Thomas W. Roberts Sep. 1983 98 p refs

(Grants NGT-22-009-901; NAG2-105)

(NASA-CR-166542; NAS 1.26:166542; CFDL-TR-83-5) Avail: NTIS HC A05/MF A01 CSCL 20D

A finite difference scheme for solving the motion of a number of vortex rings is developed. The method is an adaptation of the 'cloud-in-cell' technique to axisymmetric flows, and is thus a combined Eulerian-Lagrangian technique. A straightforward adaptation of the cloud-in-cell scheme to an axisymmetric flow field is shown to introduce a grid dependent self-induced velocity to each vortex ring. To correct this behavior the potential is considered to consist of two parts, a local and a global field. An improved difference formula is derived, allowing the accurate calculation of the potential at points near vortex locations. The local potential is then subtracted before calculating the velocity, leaving only the influences of the remaining vortices. The correct self-induced velocity is then explicitly added to the vortex velocity. Calculations of the motion of one and two vortex rings are performed, demonstrating the ability of the new method to eliminate the grid dependence of the self-induced velocity. The application of the method to the calculation of helicopter rotor flows in hover is attempted. M.G.

N84-17527*# California Univ., Los Angeles. School of Engineering and Applied Science.

VAPOR-LIQUID PHASE SEPARATOR STUDIES

S. W. K. Yuan, J. M. Lee, Y. I. Kim, W. A. Hepler, and T. H. K. Frederking Oct. 1983 87 p refs

(Contract NCC2-64)

(NASA-CR-166545; NAS 1.26:166545; UCLA-ENG-8349) Avail: NTIS HC A05/MF A01 CSCL 20D

Porous plugs serve as both entropy rejection devices and phase separation components separating the vapor phase on the downstream side from liquid Helium 2 upstream. The liquid upstream is the cryo-reservoir fluid needed for equipment cooling by means of Helium 2, i.e Helium-4 below its lambda temperature in near-saturated states. The topics outlined are characteristic lengths, transport equations and plug results. Author

N84-17528*# Stanford Univ., Calif. Dept. of Mechanical Engineering.

IMPROVED TURBULENCE MODELS BASED ON LARGE EDDY SIMULATION OF HOMOGENEOUS, INCOMPRESSIBLE TURBULENT FLOWS Final Report

J. Bardino, J. H. Ferziger, and W. C. Reynolds May 1983 192 p refs

(Contract NCC2-15)

(NASA-CR-166541; NAS 1.26:166541; SU-TF-19) Avail: NTIS HC A09/MF A01 CSCL 20D

The physical bases of large eddy simulation and subgrid modeling are studied. A subgrid scale similarity model is developed that can account for system rotation. Large eddy simulations of homogeneous shear flows with system rotation were carried out. Apparently contradictory experimental results were explained. The main effect of rotation is to increase the transverse length scales in the rotation direction, and thereby decrease the rates of dissipation. Experimental results are shown to be affected by conditions at the turbulence producing grid, which make the initial states a function of the rotation rate. A two equation model is proposed that accounts for effects of rotation and shows good agreement with experimental results. In addition, a Reynolds stress model is developed that represents the turbulence structure of homogeneous shear flows very well and can account also for the effects of system rotation. S.L.

N84-17529*# Wisconsin Univ., Madison. Space Physics Lab.

THE TIME DEVELOPMENT OF A BLAST WAVE WITH SHOCK HEATED ELECTRONS

Richard J. Edgar and Donald P. Cox [1983] 45 p refs

(Grant NGL-50-002-044)

(NASA-CR-175364; NAS 1.26:175364) Avail: NTIS HC A03/MF A01 CSCL 20D

Accurate approximations are presented for the time development of both edge conditions and internal structures of a blast wave with shock heated electrons, and equal ion and electron temperatures at the shock. The cases considered evolve in cavities with power law ambient densities (including the uniform ambient density case) and have negligible external pressure. Account is taken of possible saturation of the thermal conduction flux. The structures evolve smoothly to the adiabatic structures. Author

N84-17530*# United Technologies Research Center, East Hartford, Conn.

MASS AND MOMENTUM TURBULENT TRANSPORT EXPERIMENTS WITH CONFINED SWIRLING COAXIAL JETS Interim Report, 18 Oct. 1981 - 31 Aug. 1983

Richard Roback and Bruce V. Johnson Aug. 1983 260 p refs

(Contract NAS3-2271)

(NASA-CR-168252; NAS 1.26:168252; R83-915540-26) Avail: NTIS HC A12/MF A01 CSCL 20D

Swirling coaxial jets mixing downstream, discharging into an expanded duct was conducted to obtain data for the evaluation and improvement of turbulent transport models currently used in a variety of computational procedures throughout the combustion community. A combination of laser velocimeter (LV) and laser induced fluorescence (LIF) techniques was employed to obtain mean and fluctuating velocity and concentration distributions which were used to derive mass and momentum turbulent transport parameters currently incorporated into various combustor flow models. Flow visualization techniques were also employed to determine qualitatively the time dependent characteristics of the flow and the scale of turbulence. The results of these measurements indicated that the largest momentum turbulent transport was in the r-z plane. Peak momentum turbulent transport rates were approximately the same as those for the nonswirling flow condition. The mass turbulent transport process for swirling flow was complicated. Mixing occurred in several steps of axial and

radial mass transport and was coupled with a large radial mean convective flux. Mixing for swirling flow was completed in one-third the length required for nonswirling flow. Author

N84-17531*# Vought Corp., Dallas, Tex.
HIGH CAPACITY HEAT PIPE PERFORMANCE DEMONSTRATION Final Report
19 Dec. 1983 25 p refs
(Contract NAS9-16582)
(NASA-CR-171733; NAS 1.26:171733) Avail: NTIS HC A02/MF A01 CSCL 20D

A high capacity heat pipe which will operate in one-g and in zero-g is investigated. An artery configuration which is self-priming in one-g was emphasized. Two artery modifications were evolved as candidates to achieve one-g priming and will provide the very high performance: the four artery and the eight artery configurations. These were each evaluated analytically for performance and priming capability. The eight artery configuration was found to be inadequate from a performance standpoint. The four artery showed promise of working. A five-inch long priming element test article was fabricated using the four artery design. Plexiglas viewing windows were made on each end of the heat pipe to permit viewing of the priming activity. The five-inch primary element would not successfully prime in one-g. Difficulties on priming in one-g raised questions about zero-g priming. Therefore a small test element heat pipe for verifying that the proposed configuration will self-prime in zero-g was fabricated and delivered. Author

N84-17532*# Old Dominion Univ., Norfolk, Va. Dept. of Mathematics.
STABILITY OF THE LAMINAR BOUNDARY LAYER IN A STREAMWISE CORNER Final Report
William D. Lakin Feb. 1984 35 p refs
(Grant NAG1-297)
(NASA-CR-173282; NAS 1.26:173282) Avail: NTIS HC A03/MF A01 CSCL 20D

The stability of viscous, incompressible flow along a streamwise corner, often called the corner boundary layer problem is examined. The semi-infinite boundary value problem satisfied by small amplitude disturbances in the 'bending boundary layer' region is obtained. The mean secondary flow induced by the corner exhibits a flow reversal in this region. Uniformly valid 'first approximations' to solutions of the governing differential equations are derived. Uniformity at infinity is achieved by a suitable choice of the large parameter and use of an approximate Langer variable. Approximations to solutions of balanced type have a phase shift across the critical layer which is associated with instabilities in the case of two dimensional boundary layer profiles. S.L.

N84-17533*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL STUDY OF BUBBLE CAVITIES ATTACHED TO A ROTATING SHAFT IN A RESERVOIR
R. C. Hendricks, M. J. Braun (Akron Univ.), and R. L. Mullen (Case Western Reserve Univ.) 1984 7 p refs Presented at the Cavitation and Multiphase Flow Forum, New Orleans, 11-17 Feb. 1984
(NASA-TM-83586; NAS 1.15:83586; E-1975) Avail: NTIS HC A02/MF A01 CSCL 20D

Bubble cavities formed by air entrainment and attached to a rotating shaft in an oil reservoir were studied. The cavities appear to the unaided eye as toroidal. High speed photography, however, reveals the individuality of the bubble cavities and their near solid body rotational characteristics. The cavities are distorted by the rotation effects but remain attached and tend to merge because of edge effects in the axial direction. The flow field within the reservoir is influenced by the unusual character of the two phase fluid found there; the vorticity is readily visualized. Other examples of vapor entrapment at the inlet of an eccentric rotor are also discussed. A simplified analytical method is provided, and a numerical analysis is being investigated. Vapor (void) entrainment and generation can significantly alter leakage rates and stability of seals, bearings, and dampers. Recognition of these effects in the component design systems will result only after detailed studies of the above phenomena. S.L.

N84-17534*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CORRELATIONS OF SUPERSONIC BOUNDARY-LAYER TRANSITION ON CONES INCLUDING EFFECTS OF LARGE AXIAL VARIATIONS IN WIND-TUNNEL NOISE
Fang-Jenq Chen (Systems and Applied Sciences Corp.), Ivan E. Beckwith, and Theodore R. Creel, Jr. Jan. 1984 56 p refs
(NASA-TP-2229; NAS 1.60:2229; L-15669) Avail: NTIS HC A04/MF A01 CSCL 20D

Transition data on sharp tip cones in two pilot low disturbance wind tunnels at Mach numbers of 3.5 and 5 were correlated in terms of noise parameters with data from several conventional wind tunnels and with data from supersonic flight tests on a transition cone. The noise parameters were developed to account for the large axial variations of the free stream noise and the very high frequency noise spectra that occurred in the low disturbance tunnels for some test conditions. The noise could be varied in these tunnels from high levels, approaching those in conventional tunnels, to extremely low levels. The correlations indicated that transition in the low disturbance tunnels was dominated by the local stream noise that was incident on the cone boundary layer unstream of the neutral stability point. The correlation results also suggested that high frequency components of the low disturbance tunnel noise spectra had significant effects on transition when the noise was incident on the boundary layer both upstream and downstream of the neutral stability point. S.L.

N84-17535# Nielsen Engineering and Research, Inc., Mountain View, Calif.
STUDIES AND VORTICITY EFFECTS BY THE EULER EQUATIONS WITH EMPHASIS ON SUPERSONIC FLOW FIELDS Final Report
J. N. Nielsen and G. D. Kuhn Oct. 1983 117 p
(Contract N00014-82-C-0391)
(AD-A135118; NEAR-TR-310) Avail: NTIS HC A06/MF A01 CSCL 20/4

The primary purpose of the present report is to demonstrate how well the Euler equations in a supersonic marching program (SWINT) can predict the flow fields of bodies, wings, and wing-body combinations. The motivation was to see if if the Euler equations will predict the fin loads in highly vortical flow fields for cruciform missiles. Body-alone and wing-body flow fields were measured in the Bumblebee Program at a position where a tail might be placed. Those data, compared with the predictions of the Euler code, showed problems in both data and predictions. The data sometimes exhibited lack of repeatability which prevented critical comparison of data and theory in many instances. Also the lack of a sufficient number of nodes in the reverse flow regions of the flow made it difficult to get good predictions in this area. Some improvements were obtained by clustering. Computer studies of the flow field behind the wing showed that wing thickness effects had only a small effect on the calculated flow field. Also, imposition of a Kutta condition at the wing side edge had a small effect on the calculated flow field. GRA

N84-17536# Florida Univ., Gainesville. Dept. of Mathematics.
THE EFFECT OF THE ARTIFICIAL FAR FIELD BOUNDARY ON A FINITE DIFFERENT APPROXIMATION OF THE NAVIER-STOKES EQUATIONS FOR A COMPRESSIBLE FLUID Final Report, 1 May 1982 - 30 Apr. 1983
P. J. McKenna 30 Jun. 1983 54 p
(Grant AF-AFOSR-0171-82; AF Proj. 2304)
(AD-A135152; AFOSR-83-0928TR) Avail: NTIS HC A04/MF A01 CSCL 20/4

During this period the principal investigator has considered the effect of the artificial far field boundary on a finite different approximation of the Navier-Stokes equations for a compressible fluid considered for two dimensional boundary conditions for the far-field boundary can results in some of the following phenomena: (1) reflecting boundary conditions, in which the disturbances in

the physical variables represented by the difference between the steady state flow and the initial conditions are not allowed to exit through the far-field boundary but instead continue echoing up and down the grid; (2) under-specified boundary conditions, in which the converged steady state solution may depend on the initial conditions; and (3) over-specified boundary conditions in which large errors are introduced before convergence takes place. The following conclusions may be drawn from the numerical experiments conducted as a part of the research effort: There are four distinct artificial nonreflecting boundaries containing free-stream information, these being the inflow, outflow, top-sidewall and bottom-sidewall. Each of these boundaries must be treated differentially, or errors are introduced into the system. GRA

N84-17537# Minnesota Univ., Minneapolis. Inst. for Mathematics and its Applications.
DETERMINISTIC CHAOS IN MATERIALS EXHIBITING PHASE TRANSITIONS Final Report
M. Slemrod 1 Jun. 1983 9 p
(Grant AF-AFOSR-0246-82; AF Proj. 2304)
(AD-A135172; AFOSR-83-0929TR) Avail: NTIS HC A02/MF A01 CSCL 20/13

The author spent one half of the Spring 1983 semester at the Institute for Mathematics and its Applications. During that time he interacted with colleagues, engaged in research, and gave two public lectures at the Institute: chaos in phase transitions, and dynamics of phase transitions. The main thrust of his research was in two areas, specifically: deterministic chaos in materials exhibiting phase transitions, and admissibility criteria for weak solutions of the non-hyperbolic conservation laws which describe dynamic phase transitions. GRA

N84-17538# United Technologies Research Center, East Hartford, Conn. Gas Turbine Technology Group.
HOT-WIRE MEASUREMENTS OF VELOCITY AND TEMPERATURE FLUCTUATIONS IN A HEATED TURBULENT BOUNDARY LAYER Interim Report
M. F. Blair and J. C. Bennett (Connecticut Univ., Storrs) 1983 34 p
(Contract F49620-81-C-0053; AF Proj. 2307)
(AD-A135212; AFOSR-83-0923TR) Avail: NTIS HC A03/MF A01 CSCL 14/2

This paper describes the development of a multi-element hot-wire anemometry system designed to measure a wide variety of fluctuating velocity and temperature quantities in non-isothermal boundary layer flows. Descriptions of the design and evaluation of the multi-element probes and the analog-digital data recording and analysis system are included. Special features of this system were: (1) that the hot-wire probes employed sensors of reasonably practical size (2.5 microns dia.); and (2) that only standard, commercially available constant-temperature anemometers were utilized. Sample data, including Reynolds stress and turbulent Prandtl number distributions, demonstrate that boundary layer turbulence statistics were measured accurately with this system.
Author (GRA)

N84-17539# Iowa Inst. of Hydraulic Research, Iowa City.
THREE-DIMENSIONAL TURBULENT BOUNDARY LAYER ON A BODY OF REVOLUTION AT INCIDENCE Final Report, 1 May 1980 - 31 Jul. 1983
V. C. Patel and B. R. Ramaprian Aug. 1983 29 p
(Grant AF-AFOSR-0148-80; AF Proj. 2307)
(AD-A135454; IIHR-LD-REPORT-113; AFOSR-83-1024TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

An experimental and theoretical study of three-dimensional boundary layers on bodies of revolution at incidence was conducted during the period May 1980-July 1983. This final report summarizes the technical accomplishments. Reference is made to previous reports and papers resulting from the study and some recent experimental results on the boundary layer in the plane of symmetry and the vortex formation region are presented. One of the primary objectives of this study was to develop instrumentation for the measurement of the mean flow and the Reynolds stresses in three-dimensional turbulent boundary layers, and to use these to supplement the mean-flow measurements made earlier by Ramaprian, Patel and Choi on the combination body at an incidence of 15 degrees. GRA

N84-17540# California Univ., San Diego.
STUDIES ON THE MECHANICS OF RAPIDLY FLOWING GRANULAR-FLUID MATERIALS Ph.D. Thesis
D. M. Hanes 1983 145 p
(Contract N00014-83-C-0182)
(AD-A135463) Avail: NTIS HC A07/MF A01 CSCL 20/4

This work addresses the subset of flows of granular materials known as rapidly flowing, granular-fluid materials. Experiments were conducted in an annular, parallel plate shear cell with two primary goals in mind. The first was to investigate the existence of an internal boundary above which the material deformed rapidly, but below which the material remained rigidly locked in place. The second goal was to examine the constitutive behavior of rapidly flowing granular-fluid materials bounded by parallel, roughened plates. The constitutive theories of McTigue (1979) and Jenkins and Savage (1983) are applied to study the steady, rapid flow of a semi-infinite granular bed under the influence of gravity and traction applied to its surface. Analytic solutions based upon McTigue's theory and numerical solutions based upon Jenkins and Savage's theory both suggest that there is a finite thickness of motion in the bed. GRA

N84-17541# Castar, Inc., Evanston, Ill.
FUNDAMENTALS OF NON-NEWTONIAN LIQUID FLOW ON SURFACES Final Report, Jul. 1982 - May 1983
Simon Rosenblat and Stephen H. Davis Aberdeen Proving Ground, Md. Army Armament Research and Development Command Jun. 1983 71 p
(Contract DAAK11-82-C-0078)
(AD-A135543; ARCSL-CR-83062) Avail: NTIS HC A04/MF A01 CSCL 20/4

Polymers, which are added to liquids to control the liquid's dissemination properties, also alter the rheological properties of the liquid. The polymer solutions exhibit such non-Newtonian properties as shear thinning and normal stress, which are not included in the usual Newtonian fluid model. This report evaluates theoretically how these non-Newtonian properties affect the spreading of liquid drops on ideal surface. Using the lubrication approximation, the spread rates and size doubling times are numerically calculated. Results show that shear thinning and normal stresses are considerably less important than the zero-shear-rate viscosity, and affect the spreading only during the initial spreading period, during which the drop is less than twice its original size. The viscosity's shear dependence and the normal stresses cause the size doubling time to change by less than 10% of the size doubling time of a similar drop of Newtonian liquid. Spreading on a tilted surface is also examined and its is found to be accountable by the addition of a translational motion to the spreading motion on the previously considered horizontal surface. GRA

N84-17542# Dayton Univ., Ohio.
LASER DIAGNOSTIC DEVELOPMENT AND MEASUREMENT AND MODELING OF TURBULENT FLOWFIELDS OF JETS AND WAKES. PART 1: TWO-DIMENSIONAL LASER DOPPLER ANEMOMETER STUDIES OF ISOTHERMAL FLOWFIELD IN A DUCTED CENTERBODY COMBUSTOR Final Report, 1 Apr. 1978 - 30 Sep. 1982
A. J. Lightman, P. D. Magill, and R. J. Andrews Wright-Patterson AFB, Ohio AFWAL Jun. 1983 139 p
(Contract F33615-78-C-2005; AF Proj. 3048)
(AD-A134691; UDR-TR-83-22; AFWAL-TR-83-2044) Avail: NTIS HC A07/MF A01 CSCL 20/4

A two-dimensional laser Doppler anemometer was designed to take measurements in a ducted coaxial flow system having a centerbody separating the jets. The measurements, made in isothermal flow, can be categorized as: central jet only (CO2); annular jet only (air); and, combined central and annular jet flow. Radial profiles of the axial and radial/azimuthal velocity were

obtained. The central jet only condition approximates a free jet since the central jet diameter is much smaller than the centerbody or duct diameter (1:29.3: 53.2). Measurements of the jet development (diameter, turbulence intensity, etc.) were compared with previous free jet studies. In a study of the isotropy of the turbulent fluctuations it was determined that fully developed turbulent flow begins further downstream than anticipated. Velocity profiles were combined with gas sampling measurements to ascertain jet entrainment. Results show a linear growth of the entrained mass starting at the entrance plane. Downstream (20 diameters) the rate of growth increases to match past studies in that region. The annular jet flow creates a recirculation vortex in the wake of the centerbody. The flowfield was mapped and the streamlines describing the flow were obtained throughout the recirculating flow and further downstream. GRA

N84-17543# Dayton Univ., Ohio. Research Inst.
LASER DIAGNOSTIC DEVELOPMENT AND MEASUREMENT AND MODELING OF TURBULENT FLOWFIELDS OF JETS AND WAKES. PART 2: NUMERICAL PREDICTIONS OF ISOTHERMAL FLOWFIELDS IN A DUCTED CENTERBODY COMBUSTOR Final Report, 1 Apr. 1978 - 30 Sep. 1982
L. Krishnamurthy, S. O. Park, D. J. Wahrer, and H. S. Cochran Wright-Pattersn AFB, Ohio AFWAL Jun. 1983 135 p
(Contract F33615-78-C-2005; AF Proj. 3048)
(AD-A134692; UDR-TR-83-04; AFWAL-TR-83-2044-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 20/4

Finite-difference numerical computations are presented to predict the isothermal, turbulent, recirculating flowfields in a centerbody combustor configuration which involves confined dual coaxial jet mixing in the near-wake region of an axisymmetric bluff body. Calculations based upon the Reynolds-averaged Navier-Stokes equations and the k-epsilon turbulence model consider the influence of the annular and central flow rates on the nature of the flowfield downstream of the bluff body. The reported isothermal modeling calculations are performed with the 'Teaching Elliptic Axisymmetrical Characteristics Heuristically' (TEACH) Code. Numerical results show the influence of the annular and central jet flow rates on the distributions of the mean and rms velocity fields and centerline locations of stagnation points. The sensitivity of the predicted results to several aspects of the modeling is considered. The predicted results demonstrate the complexity of flowfield interactions in the near-wake region and refine the understanding of the centerbody combustor flowfields. The character of the recirculating flowfield emerging from the numerical predictions when the near-wake is dominated by the annular jet is in conformity with experimental observations. GRA

N84-17544# Dayton Univ., Ohio.
LASER DIAGNOSTIC DEVELOPMENT AND MEASUREMENT AND MODELING OF TURBULENT FLOWFIELDS OF JETS AND WAKES. PART 3: THE DEVELOPMENT OF A 2-CHANNEL CW TIME-RESOLVES LASER RAMAN SPECTROSCOPY (TILaRS) SYSTEM FOR MEASUREMENTS IN GAS FLOWFIELDS Final Report, 1 Apr. 1978 - 30 Sep. 1982
P. P. Yaney, R. J. Becker, P. T. Danset, and M. R. Gallis Wright-Patterson AFB, Ohio AFWAL Jun. 1983 151 p
(Contract F33615-78-C-2005; AF Proj. 3048)
(AD-A134693; UDR-TR-83-52; AFWAL-TR-83-2044-Pt-3) Avail: NTIS HC A08/MF A01 CSCL 20/4

The design and performance of a photon counting, two-channel spectroscopic system using the 6-W, 448-nm line of a CW argon ion laser is described. The two channels are formed by use of cylindrical optics and special slit mirrors set up following the exit slit of a conventional double spectrometer. The system is capable of dynamic, simultaneous measurements of either the concentrations of two gas species in cold flow or the temperature and concentration of a single gas species, such as N2, in a flame. Measurements are accomplished by recording the intensities of two spontaneous rotational Raman lines with spectral bandwidths between 0.04 and 0.08 nm. Up to 4096 samples (or reads from each of the two channels) can be recorded by a dedicated minicomputer at rates up to 10 kHz. Studies of a CH4 diffusion flame at sampling rates of 20 to 100 Hz and a room-temperature, axisymmetric CO2 jet at rates up to 2.0 kHz were carried out. Analysis of the data from these studies include mean and rms profiles, probability density functions (pdf's), power spectral density functions, autocorrelation functions, cross correlation functions, and determinations of skewness and kurtosis in the pdf's and the CO2 fluctuations. GRA

N84-17545# Science Applications, Inc., Wayne, Pa.
NUMERICAL SIMULATION OF FLOW OVER ROUGH SURFACES, INCLUDING EFFECTS OF SHOCK WAVES Final Technical Report, Aug. 1982 - Jan. 1983
G. H. Christoph and A. W. Fiore Aug. 1983 41 p
(Contract F33615-82-M-3029; AF Proj. 2307)
(AD-A134700; SAI-067-84R-001; AFWAL-TR-83-3071) Avail: NTIS HC A03/MF A01 CSCL 20/4

The finite-difference boundary layer method of Christoph and Pletcher for flow over rough surfaces is extended to include the effect of shock waves off roughness elements. The equivalent sand-grain roughness height is not needed, but rather the actual roughness height and spacing is used. A turbulence model that contains very little empiricism but yet is capable of accounting for roughness height, spacing, and geometry is presented. Computations are presented for smooth and rough wall profiles and skin friction data obtained at AFWAL in the Mach 6 facility. Agreement is quite good, especially in light of the fact that in no way was the turbulence modeling adjusted during these comparisons.
Author (GRA)

N84-17546# Ballistic Research Labs., Aberdeen Proving Ground, Md.
INVERSION OF RINGDOWN DATA FOR A ROTATING LIQUID CYLINDER Final Report
Keith D. Aldridge Sep. 1983 57 p
(DA Proj. 1L1-61102-AH-43)
(AD-A134742; AD-F300339; ARBRL-TR-02526) Avail: NTIS HC A04/MF A01 CSCL 12/1

Disturbance pressure data from both numerical and gyroscope experiments on ringdown of inertial waves were fitted to a sum of complex exponentials using a linearized least squares method. For the numerical experiments, frequencies and decay rates agreed with those predicted by eigenvalue calculations to within a few percent. Eigenfrequencies calculated from gyroscope data agreed with prediction to within 2% while all decay rates were greater than predicted, some by as much as 65%. An autoregressive method was developed and tested on both simulated and real data. At its present stage of development this approach was found to be inferior to the least squares method.
Author (GRA)

N84-17547# Naval Postgraduate School, Monterey, Calif.
CHARACTERISTICS OF A FOUR NOZZLE, SLOTTED MIXING STACK WITH SLANTED SHROUD, GAS EDUCTOR SYSTEM M.S. Thesis
N. D. Pritchard, Jr. Sep. 1983 124 p
(AD-A134794; AD-E301231) Avail: NTIS HC A06/MF A01 CSCL 20/4

Cold flow tests were conducted on a four nozzle gas educator system to evaluate the system's performance using a slotted mixing stack with slanted shroud and diffuser rings. The stack length-to-diameter ratios evaluated were 1.5 and 2.25. The nozzles were constructed with a ratio of total area or primary flow to area of mixing stack of 2.5. One set of straight nozzles and another set, tilted at 15 degrees, were used. Secondary and tertiary pumping coefficients, and mixing stack pressure distributions were used to evaluate the slant shrouded mixing stacks. Pumping performance of the four straight nozzle shrouded system was found to be comparable to previously tested unshrouded models, showing no specific advantages. Pumping performance of the tilted nozzles and slanted shroud showed an improvement over the straight shroud model, with a noticeable increase in the tertiary pumping.
GRA

N84-17548# Illinois Inst. of Tech., Chicago. Dept. of Mechanics, Mechanical, and Aerospace Engineering.
UNDERSTANDING TRANSITION TO TURBULENCE IN SHEAR LAYERS Final Report, 1 Oct. 1976 - 31 Dec. 1982
M. V. Morkovin May 1983 140 p
(Contract F49620-77-C-0013; AF Proj. 2307)
(AD-A134796; AFOSR-83-0931TR) Avail: NTIS HC A07/MF A01 CSCL 20/4

Critical examination of experimental, analytical and numerical research on shear-flow instabilities evolving into turbulence led to a conceptual framework consistent with reliable observations. Mechanically driven shear layers fall into four classes: boundary layers, confined duct flows, free shear layers, and flows in annuli between cylinders driven by the rotation of the inner cylinder. These classes correspond to distinct, initially rather homogeneous vorticity distributions. Each instability restructures these distributions; it dehomogenizes them spatially, while the very slow viscous effects smooth the largest gradients. The restructuring continues even after the shear layers become turbulent. GRA

N84-17549# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
COMPUTER MODELS FOR TWO-DIMENSIONAL TRANSIENT HEAT CONDUCTION
M. R. Albert Apr. 1983 74 p
(DA Proj. 4A7-62730-AT-42)
(AD-A134893; CRREL-83-12) Avail: NTIS HC A04/MF A01 CSCL 09/2

This paper documents the development and verification of two finite difference models that solve the general two-dimensional form of the heat conduction equation, using the alternative-direction implicit method. Both can handle convective, constant flux, specified temperature and semi-infinite boundaries. The conducting medium may be composed of many materials. The first program, ADI, solves for the case where no change of state occurs. ADIPC solves for case where a freeze/thaw change of phase may occur, using the apparent heat capacity method. Both models are verified by comparison to analytical results. Author (GRA)

N84-17550# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
SIMULATION OF NATURAL CONVECTION IN A RECTANGULAR LOOP USING FINITE ELEMENTS
D. W. Pepper, L. L. Hamm, and A. B. Kehoe 1984 16 p refs Presented at the 5th Intern. Symp. on Finite Element Methods in Flow Probls., Austin, Tex., 23-26 Jan. 1984
(Contract DE-AC09-76SF-00001)
(DE84-003477; DP-MS-83-25; CONF-840119-2) Avail: NTIS HC A02/MF A01

A two dimensional finite element analysis of natural convection in a rectangular loop is presented. A psi-omega formulation of the Boussinesque approximation to the Navier-Stokes equation is solved by the false transient technique. Streamlines and isotherms at Ra = 10(4) are shown for three different modes of heating. It is indicated that corner effects should be considered when modeling flow patterns in thermosyphons. DOE

N84-17551# Los Alamos Scientific Lab., N. Mex. Heating and Analysis Group.
ACQUISITION SYSTEMS FOR HEAT TRANSFER MEASUREMENT
Richard J. DeWitt 1983 32 p refs Presented at the Measurement Techniques in Power Eng. Summer School, Dubrovnik, Yugoslavia, 29 Aug. - 6 Sep. 1983
(Contract W-7405-eng-36)
(DE84-003779; LA-UR-83-3205; CONF-830852-2) Avail: NTIS HC A03/MF A01

Practical heat transfer data acquisition systems are normally characterized by the need for high resolution, low drift, low speed recording devices. Analog devices such as strip chart or circular recorders and FM analog magnetic tape have excellent resolution and work well when data will be presented in temperature versus time format only and need not be processed further. Digital systems are more complex and require an understanding of the following components: digitizing devices, interface but types, processor requirements, and software design. The components of analog and digital data acquisition, as they are used in current practice are discussed. DOE

N84-17552# Technische Univ. Munich, Garching (West Germany). Sonderforschungsbereich 81.
FLOW TECHNICAL PROBLEMS WITH TRANSITIONS BETWEEN PARTIAL AND COMPLETE FILLING AND WITH FLOW MEASUREMENT IN CHANNEL SECTIONS. Final Report [STROEMUNGSTECHNISCHE PROBLEME BEI UEBERGAENGEN ZWISCHEN TEIL-UND VOLLFUELLUNG UND DURCHFLUSSBESTIMMUNG IN KANALSTRECKEN]
Franz Valentin 1981 88 p refs In GERMAN Sponsored by Deutsche Forschungsgemeinschaft
(TUM-SFB-81) Avail: NTIS HC A05/MF A01

Flow technical problems related to sewage systems are reviewed. Measuring systems were developed to determine the quantitative draining off in the transition domain between partial and complete filling. A mathematical model to treat flow technical phenomena was developed. Flow conditions are simulated on a test stand with closed loop, resulting in the dependence of flow through the channel as a function of flow state. The mathematical model enables the numerical calculation of unsteady flows. Author (ESA)

N84-17553# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
SIMILAR VELOCITY PROFILES AND INTEGRAL QUANTITIES OF A BOUNDARY LAYER ON A ROTATING CYLINDER [PROFILS SEMBLABLES DE VITESSE ET QUANTITES INTEGRALES D'UNE COUCHE LIMITE SUR CYLINDRE TOURNANT]
Roger Leblanc (Centre d'Essais Aeronautique, Poitiers, France) Nov. 1983 35 p refs In FRENCH
(VKI-NT-148) Avail: NTIS HC A03/MF A01

Similar solutions for the laminar boundary layer of a rotating cylinder in axial compressible flow were calculated for a range of pressure gradients (B) and rotations (r). Two pairs of parameters B and r such that the corresponding longitudinal and circumferential velocity profiles are identical are found. A linear relation exists between B and r, and all the profiles can be calculated in relation to them. The integral quantities of the boundary layer can be used to calculate complex configurations such as shock/boundary layer interaction on rotating bodies. Rotation energizes the longitudinal acceleration velocity profile with an excess velocity for the highest values of r. Rotation reduces separation judged as the negative value of the axial component. It also reduces the circumferential velocity profile. Author (ESA)

N84-17554# Iowa Inst. of Hydraulic Research, Iowa City.
TURBULENCE MEASUREMENTS IN PLANE JETS AND PLUMES IN CROSSFLOW
B. R. Ramaprian and H. Haniu Aug. 1983 374 p refs
(Grants NSF ENG-77-22756; NSF CME-80-06797)
(PB84-105303; IIHR-266) Avail: NTIS HC A16/MF A01 CSCL 20D

An experimental study of two dimensional jets in cross flow is reported. The cases studied include both nonbuoyant and buoyant jets. The experiments were performed in a hydraulic flume. Hot water was discharged vertically upwards from the bottom of the flume to simulate the heated jet. Measurements of the instantaneous velocity and instantaneous temperature were made using a two component laser Doppler anemometer and a microresistance thermometer respectively. A simple but effective technique was developed for using the LDA in a nonisothermal environment. An important objective was to obtain the key data needed for the development of turbulence models and calculation procedures for flows affected by buoyancy and/or streamline curvature. GRA

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N84-17555* National Aeronautics and Space Administration. Pasadena Office, Calif.

APPARATUS AND METHOD FOR DESTRUCTIVE REMOVAL OF PARTICLES CONTAINED IN FLOWING FLUID Patent

Lien C. Yang, ed. (JPL, California Inst. of Tech., Pasadena) Issued 14 Oct. 1980 14 p Filed 14 Oct. 1980 Supersedes N83-20447 (21 - 10, p 1567) Sponsored by NASA

(NASA-Case-NPO-15426-1; US-Patent-4,376,637; US-Patent-Appl-SN-196877; US-Patent-Class-55-2; US-Patent-Class-55-6; US-Patent-Class-55-12; US-Patent-Class-55-96; US-Patent-Class-55-105; US-Patent-Class-55-126; US-Patent-Class-55-131; US-Patent-Class-55-138; US-Patent-Class-55-139; US-Patent-Class-55-283; US-Patent-Class-55-291; US-Patent-Class-55-466; US-Patent-Class-55-DIG.25; US-Patent-Class-55-DIG.30; US-Patent-Class-55-270; US-Patent-Class-55-145; US-Patent-Class-60-275; US-Patent-Class-60-303; US-Patent-Class-60-311; US-Patent-Class-422-121; US-Patent-Class-422-169; US-Patent-Class-422-178; US-Patent-Class-422-186; US-Patent-Class-210-748) Avail: US Patent and Trademark Office CSCL 14B

An apparatus and method for destructively removing particles from a flowing gas containing the particles is described. In the specific embodiments disclosed the apparatus is adapted to remove carbon particles from diesel engine exhaust products. The exhaust products are directed to a predetermined location where they are rapidly vaporized and combine with oxygen in the exhaust products to form carbon dioxide. Vaporization in one embodiment is effected by a discharge grid located within an exhaust conduit, the grid being chosen so that alternate conductors defining the grid are spaced apart a distance approximately 125 times the mean diameter of the particles to be removed. A voltage differential of approximately 690 volts is applied across adjacent conductors. Office Gazette of the U.S. Patent and Trademark Office

N84-17556*# Siebelair Corp., Los Angeles, Calif.

NSI-1 SQUIB ADAPTER DEVELOPMENT AND FINAL TEST REPORT FOR USAGE ON SPACE SHUTTLE GAS SAMPLER VALVE/BOTTLE ASSEMBLY 3270

J. E. Siebel 15 Jun. 1983 21 p

(Contract NAS9-16814)

(NASA-CR-171735; NAS 1.26:171735; ER-2273-8) Avail: NTIS HC A02/MF A01 CSCL 14B

The possibility of utilizing the NSI-1 squib in place cartridge assembly 2270 for the function of both events required for the Space Shuttle Gas Sampler Valve/Bottle Assembly 3270 was determined. Additionally, it was a requirement that the closure disk of the NSI-1 squib and explosive residue therefrom be retained from the valve cavity in so far as possible to prevent any significant particulate from scratching the valve bore and causing sample leakage following the postfire 2 event. S.L.

N84-17557# Materials Research Labs., Melbourne (Australia).

IMPROVEMENTS TO HIGH SPEED ROTATING PRISM CAMERAS INCLUDING ON BOARD TIMING AND EVENT PULSE GENERATORS

Kenneth J. Lee Aug. 1983 28 p

(MRL-TN-476; AR-003-800) Avail: NTIS HC A03/MF A01

Details of modifications incorporated in a Hycam rotating prism high speed camera are reported. The modifications, adaptable to most high speed cameras, include remote DC starting, an on-board timing light generator and an event pulse generator. These and other modifications described have improved the performance, reliability and ease of operation of high speed cameras both in the laboratory and in the field. Author

N84-17558*# IIT Research Inst., Chicago, Ill.

EMBEDDED GAGE IMPACT STUDY Final Contract Report, Aug. 1981 - Mar. 1983

S. W. Schramm and I. M. Daniel Jan. 1984 58 p refs

(Contract NAS1-16763)

(NASA-CR-172227; NAS 1.26:172227; K06018) Avail: NTIS HC A04/MF A01 CSCL 14B

Impact damage in graphite/epoxy laminates was characterized and transient strain history during impact was correlated. The material investigated was AS-4/3501-6 graphite/epoxy. Eight-ply and sixteen-ply quasi-isotropic laminates of [45/0/-45/90] sub s and [45/0/-45/90] sub 2s layups were fabricated with strain gages embedded between plies during the strain gages and leads from the highly conductive graphite fibers. The specimens were circular plates 12.7 cm (5 in.) in diameter and clamped along their circumference. The specimens were impacted with a 185 gm impactor, dropped from heights of 1.20 m and 1.65 m. An accelerometer was attached to the back surface of the specimen opposite the impact point and was used to trigger the recording instrumentation. The transient strain data were recorded with an eight channel waveform digitizer capable of sampling data at 0.5 microsec intervals. The data were stored, processed, and plotted by means of a microcomputer. Transient strain data were correlated with results from ultrasonic inspection of the specimens. S.L.

N84-17559*# Fairchild Weston Systems, Inc., Syosset, N.Y. Target Acquisition Systems Dept.

SPAS COLOR CAMERA Final Report

C. Toffales 10 May 1983 23 p

(Contract NAS9-16850)

(NASA-CR-171739; NAS 1.26:171739; ED-AX-316) Avail: NTIS HC A02/MF A01 CSCL 14E

The procedures to be followed in assessing the performance of the MOS color camera are defined. Aspects considered include: horizontal and vertical resolution; value of the video signal; gray scale rendition; environmental (vibration and temperature) tests; signal to noise ratios; and white balance correction. A.R.H.

N84-17560*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A NONINTRUSIVE NUCLEAR MONITOR FOR MEASURING LIQUID CONTENTS IN SEALED VESSELS

Jag J. Singh and Gerald H. Mall (Computer Sciences Corp., Hampton, Va.) Feb. 1984 33 p

(NASA-TM-85754; NAS 1.15:85754) Avail: NTIS HC A03/MF A01 CSCL 14B

A nonintrusive nuclear technique for monitoring fluid contents in sealed vessels, regardless of the fluid distribution inside the vessels is described. The technique is applicable to all-g environments. It is based on the differences in Cesium-137 gamma ray attenuation coefficients in air and the test liquids. Author

N84-17561# BDM Corp., McLean, Va.

ASSESSMENT OF THE POTENTIAL OF LANGMUIR-BLODGETT FILMS FOR ROOM TEMPERATURE IR (INFRARED) DETECTORS

A. D. Schnitzler 30 Sep. 1983 24 p

(Contract MDA903-83-C-0053; DARPA Order 4114)

(AD-A134616; BDM/W-83-610-TR) Avail: NTIS HC A02/MF A01 CSCL 17/5

Langmuir-Blodgett films possess high dielectric breakdown voltages and induce low surface state densities on semiconductor surfaces. These properties are valuable for surface passivation in manufacture of infrared detectors. It was suggested that these properties might be exploited in the fabrication of mercury cadmium telluride IR detectors that could operate at room temperature. However, examination of the temperature dependence of the

fundamental thermal noise sources in, LWIR detectors indicate that these are characteristic of bulk properties and even detectors made with high quality materials (high purity, high crystalline perfection) must be cooled to the vicinity of liquid nitrogen temperature to achieve background limited operation. Better passivation would reduce I/f noise in some device configurations and reduce leakage current in junction devices permitting higher RA products at below liquid nitrogen temperatures for low background operation. GRA

N84-17562# Naval Biodynamics Lab., New Orleans, La.
A DETAILED EVALUATION OF THE ENDEVCO MODEL 7302 (TRADE NAME) ANGULAR ACCELEROMETER
G. C. Willems Aug. 1983 37 p
(M0097PN)
(AD-A134882; NBDL-83R009) Avail: NTIS HC A03/MF A01 CSCL 14/2

This study documents a calibration technique for angular accelerometers and the performance of the Endevco 7302 (R) accelerometer. Parameters evaluated are: Linearity, sensitivity, crossaxis response, temperature effects, transient and frequency response, spectral fidelity and linear acceleration sensitivity. Author (GRA)

N84-17563# Naval Research Lab., Washington, D. C.
AUTOMATED ACCEPTANCE TEST PROCEDURES FOR WIDE-BAND MICROWAVE SYNTHESIZED SIGNAL GENERATOR TESTING Final Report
J. J. ONeill and T. H. Gattis 30 Sep. 1983 90 p
(AD-A134923; NRL-8755) Avail: NTIS HC A05/MF A01 CSCL 14/2

Standardized acceptance test procedures have been developed to enable the Navy to check precisely the performance characteristics of its new synthesized microwave signal generators which operate over a frequency range of 0.1 to 26.5 GHz (gigahertz). Extensive use of IEEE-488 bus-controlled instrumentation and a central processor/computer allows most of the measurements to be done automatically. Details of the individual tests performed and the hardware and software used to implement the tests are given. Test time has been reduced by at least a factor of five (conservative estimate), and test accuracy and repeatability have been enhanced significantly. Author (GRA)

N84-17564# California Univ., Livermore. Lawrence Livermore Lab.
STREAK CAMERAS FOR SOFT X-RAY AND OPTICAL RADIATION
Hector Medecki 1 Sep. 1983 8 p refs Presented at the Intern. Congr. on Appl. of Lasers and Electro-Opt., Los Angeles, 14-17 Nov. 1983
(Contract W-7405-eng-48)
(DE84-002780; UCRL-89570; CONF-831195-2) Avail: NTIS HC A02/MF A01

The principal component of a streak camera is the image converter tube. A slit shaped photocathode transforms the radiation into a proportional emission of electrons. An electron-optics arrangement accelerates the electrons and projects them into a phosphor screen creating the image of the slit. A pair of deflection plates deflects the electronic beam along a direction perpendicular to the main dimension of the slit. Different portions of the phosphor screen show the instantaneous image of the slit with brightness proportional to the number of emitted electrons and, consequently, to the intensity of the radiation. The RCA C73435A image conventer tube intended for the measurement of the radiation of light and modified to have an X-ray sensitive photocathode was used for X-ray streak cameras. Practical considerations lead to the use of transparent rather than reflecting photocathodes. DOE

N84-17565# California Univ., Livermore. Lawrence Livermore Lab. Computer Research Group.
APPROACH TO REAL-TIME HOLOGRAPHY
Howard L. Davidson and Stephen S. Friedland 15 Jul. 1983 7 p refs Presented at the 27th Ann. Intern. Tech. Symp. on High Speed Photography, Videography and Photonics, San Diego, Calif., 21-26 Aug. 1983
(Contract W-7405-eng-48)
(DE84-002779; UCRL-88913; CONF-830874-30) Avail: NTIS HC A02/MF A01

Holography which is used in 3-Dimensional data bases was investigated. In most cases the nearer to real time the hologram can be produced the more beneficial. Since a hologram is a superposition of Fresnel zone plate patterns from each point source in the object volume on to the image plane, a cellular array processor is suggested which will produce a factor of a million reduction in the time to calculate a hologram. DOE

N84-17566# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
SPECIFIC HEAT OF HE-3 IN THE FERMI-LIQUID REGION
M. C. Mayberry, W. E. Fogle, and N. E. Phillips Apr. 1983 12 p refs Presented at the Symp. on Quantum Fluids and Solids, Sanibel Island, Fla., 13 Apr. 1983
(Contract DE-AC03-76SF-00098)
(DE83-014858; LBL-15646-Rev; CONF-830456-3-Rev) Avail: NTIS HC A02/MF A01

A CMN thermometer was calibrated by nuclear orientation thermometry at low temperatures and by He vapor pressure thermometry at high temperatures. The calibration agrees well with the NBS temperature scale between 100 and 200 mK. Specific heat data on (3)He in the Fermi liquid region obtained with this thermometer are in good agreement with recent measurements. It is argued that discrepancies with other data arise from differences in the underlying temperature scales. DOE

N84-17567# Monsanto Research Corp., Miamisburg, Ohio.
EDDY CURRENT THICKNESS GAUGE FOR REEL-TO-REEL TAPE PROCESSES
Edwin D. Harvey and Walter A. Dudley 27 Oct. 1983 25 p refs
(Contract DE-AC04-76DP-00053)
(DE84-004050; MIM-3098) Avail: NTIS HC A02/MF A01

An eddy current device was designed and built to provide noncontact thickness gauging of copper and aluminum films vapor-deposited onto Kapton tape. This thickness gauge, using a 6800 series central processing unit to process eddy current information supplied by a phase-sensitive eddy current instrument, provides a precision of + or - 1 (SIGMA) in. The accuracy is limited to that of the standards used. DOE

N84-17568# California Univ., Livermore. Lawrence Livermore Lab.
POLARIZING HOLOGRAPHIC REFLECTOR FOR ELECTRON CYCLOTRON RESONANT HEATING (ECRH) ON THE TANDEM MIRROR EXPERIMENT UPGRADE (TMX-U)
F. E. Coffield, B. Felker, N. C. Gallagher, Jr., L. R. Pedrotti, B. W. Stallard, D. W. Sweeney, E. W. Wyman, and T. R. Christensen (TRW, Inc.) 14 Nov. 1983 6 p refs Presented at the 10th Symp. on Fusion Eng., Philadelphia, 5-9 Dec. 1983
(Contract W-7405-eng-48)
(DE84-003740; UCRL-89236; CONF-831203-20) Avail: NTIS HC A02/MF A01

A reflector for electron cyclotron resonant heating on the Tandem Mirror Experiment Upgrade was designed to convert the high power TE01 output of the circular waveguide system into a linearity polarized Gaussian intensity pattern in the plasma. The reflector is a computer generated holograhic optical element with a twist polarizer. Its design, fabrication, and performance are discussed. Results of the low and high power tests are presented. Low power tests were used to determine the beam pattern and the degree of cross polarization. High power tests verified that arching across the grooves of the twist polarizer does not occur. DOE

N84-17569# Societe Nationale Industrielle Aerospatiale, Cannes (France). Div. Systemes Balistiques et Spatiaux.
MODEL MISSION STUDY FOR LASER SYNCHRONIZATION OF CLOCKS Final Report [ETUDE DE MODELE DE MISSION

POUR LA SYNCHRONIZATION D'HORLOGES PAR LASER]
G. Pianca and P. Pulitina Paris ESA 15 Jun. 1983 109 p refs In FRENCH
(Contract ESA-5131/82/F-CG(SC))
(SNIAS-221-CA/LP; ESA-CR(P)-1809) Avail: NTIS HC A06/MF A01

The effect of satellite orbit and stabilization on the Laser Synchronization for Synchronous Orbit (LASSO) Sirio 2 mission are discussed, and retroreflector panel dimensions are proposed. Altitude between 5000 and 10,000 km is suggested. For orbits between 5000 and 7000 km, a 50 to 60 deg tilt is recommended, for higher altitudes, 90 deg. Ascension node longitude has no effect if phasing period exceeds 5 to 9 days. Apogee should be above the Northern Hemisphere. An excentric orbit could be used to pass quickly over areas with few ground stations. Three axis stabilization is advocated. Errors introduced by orbit parameters are less than those calculated for Sirio 2 in geostationary orbit. The Ariane transfer orbit could be advantageous, but Sun synchronous orbits do not meet experiment requirements.
Author (ESA)

N84-17570# National Bureau of Standards, Washington, D.C. National Engineering Lab.
AC VOLTAGE CALIBRATIONS FOR THE 0.1 Hz TO 10 Hz FREQUENCY RANGE Final Report
H. K. Schoenwetter Sep. 1983 64 p refs Sponsored in part by DOD Calibration Coordination Group
(PB84-109867; NBS-TN-1182) Avail: NTIS HC A04/MF A01 CSCL 14B

The development of voltmeters to meet the need for rms voltage measurements in the infrasonic frequency range and the need to trace these measurements to the U.S. legal unit of voltage are discussed. A new method for supporting voltage measurements in the 0.1Hz -10 Hz range is described. The principles of the method are embodied in detailed procedures given for calibrating sine wave voltage standards and rms voltmeters over the 0.1 Hz to 10 Hz frequency range, using the NBS AC voltmeter/calibrator. The sine wave calibrator of this instrument, used for these calibrations, has an accuracy of 0.020 are over the 0.5 mV - 7 V range. GRA

N84-17571# National Bureau of Standards, Washington, D.C.
NATIONAL BUREAU OF STANDARDS JOURNAL OF RESEARCH, VOLUME 88, NO. 4, JULY - AUGUST 1983 Bimonthly Report
Aug. 1983 65 p
(PB84-115849) Avail: NTIS HC A04/MF A01 CSCL 14B

The Journal of Research of the National Bureau of Standards reports NBS research and development in those disciplines of the physical and engineering sciences. The sciences include: physics, chemistry, engineering, mathematics, and computer sciences. A broad range of subjects, are covered and measurement methodology, and the basic technology underlying standardization are emphasized. Survey articles on topics closely related to the Bureau's technical and scientific programs are included. Each issue contains complete citations to all recent NBS publications in NBS and non-NBS media. GRA

N84-17572# Naticnal Bureau of Standards, Washington, D.C.
SPECIFICATIONS, TOLERANCES, AND OTHER TECHNICAL REQUIREMENTS FOR WEIGHING AND MEASURING DEVICES
O. K. Warnlof Nov. 1983 224 p
(PB84-125764; NBS/HB-44-1984) Avail: NTIS HC A10/MF A01 CSCL 14B

The 1984 edition of the handbook for specifications, tolerances and other technical requirements for weighting and measuring devices, is presented. It includes amendments adopted by the 68th National Conference on Weights and Measures during its annual meeting in 1983. Handbook 44 is published in its entirety each year following the annual meeting of the national conference on weights and measures. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N84-17573 California Inst. of Tech., Pasadena.
LONG WAVELENGTH InGaAsP/InP LASERS AND OPTOELECTRONIC INTEGRATION Ph.D. Thesis
Paul Kit-Lai Yu 1984 154 p
Avail: Univ. Microfilms Order No. DA8325751

The light sources for optical communications in the 1.3-1.5 microns range are the quaternary InGaAsP/InP lasers which emit in this low loss region of optical fibers. The structure and properties of some lasers fabricated in this material system as well as their integration into optoelectronics are treated. A laser with high output power is demonstrated. To further extend the operating power of indes guided laser diodes in a stable fundamental mode, gain stabilization is proposed as an effective means of discriminating against higher order transverse mode operation. The optimal design for gain stabilized fundamental mode operation is formulated theoretically and verified experimentally. Precipittous increase of threshold current with temperature was observed in some InGaAsP/InP lasers. Electron leakage over the heterobarrier was identified as the cause of this abnormality. The origin as well as the control of these leaked carriers is studied. Advances in optoelectronic integration of diffraction coupled arrays and the demonstration of laser MISFET devices and the techniques of microleaved mirrors are described in detail. The microcleavage technique is applied to the fabrication of very short cavity lasers. The advantages of short cavities are presented. Dissert. Abstr.

N84-17574*# FWG Associates, Inc., Tullahoma, Tenn.
DOPPLER LIDAR SIGNAL AND TURBULENCE STUDY Final Report
Walter Frost and K. H. Huang 23 Dec. 1983 58 p refs
(Contract NAS8-35185)
(NASA-CR-170976; NAS 1.26:170976) Avail: NTIS HC A04/MF A01 CSCL 20E

Wind fields were measured with the ground-based NASA/MSFC lidar are compared with the in situ NASA RB-57 aircraft measurements. The mean wind fields, the turbulence intensities, and the turbulence spectra determined from measurements by both systems are in very good agreement. Turbulence intensities and spectra were calculated from the fluctuations with time in the radial wind speed component. The second moment or Doppler frequency spectral width of the lidar measurements was also compared with turbulence intensities measured by the aircraft. These second moments could only be resolved at the very low altitudes (in three range bins). Turbulence intensities estimated from the spectral width data were an order of magnitude higher than those measured by the aircraft. An interesting boundary layer evolved during the progress of the experiment. The breakup of a stable boundary layer resulted in winds blowing in one direction above 600 m msl and in the opposite direction below that level. Both the aircraft and the lidar systems clearly identified this unusual boundary layer flow and showed the identical trends. A.R.H.

N84-17575*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THRESHOLD KINETICS OF A SOLAR-SIMULATOR-PUMPED IODINE LASER
John W. Wilson, Yeunggil Lee (Hampton Inst.), Willard R. Weaver, Donald H. Humes, and Ja H. Lee (Vanderbilt Univ.) Feb. 1984 43 p refs
(Grants NGT-47-020-801; NCCI-8)
(NASA-TP-2241; L-15684; NAS 1.60:2241) Avail: NTIS HC A03/MF A01 CSCL 20E

A model of the chemical kinetics of the n-C3F7I solar-simulator-pumped iodine laser is utilized to study the major kinetic processes associated with the threshold behavior of this experimental system. Excited-state diffusion to the cell wall is the dominant limiting factor below 5 torr. Excited-state diffusion to the cell wall is the dominant limiting factor below 5 torr. Excited-state recombination with the alkyl radical and quenching by the parent gas control

threshold at higher pressures. Treatment of the hyperfine splitting and uncertainty in the pressure broadening are important factors in fixing the threshold level. In spite of scatter in the experimental data caused by instabilities in the simulator high-pressure high-pressure arc, reasonable agreement is achieved between the model and experiment. Model parameters arrived at are within the uncertainty range of values found in the literature. Author

N84-17576*# Old Dominion Univ., Norfolk, Va. Dept. of Physics.

THEORETICAL STUDIES OF SOLAR-PUMPED LASERS Progress Report, 16 Jul. 1983 - 15 Jan. 1984

Wynford L. Harries and Zeng-Shevan Fong Jan. 1984 45 p refs

(Grant NsG-1568)

(NASA-CR-173283; NAS 1.26:173283; PTR-84-1) Avail: NTIS HC A03/MF A01 CSCL 20E

In any lasing medium the emission wavelength should be chosen where there is little self absorption. As emission and absorption spectra for metallic vapors did not seem available, therefore, estimates were made of these cross sections for sodium vapor as functions of wavelength. Although absolute values were not obtained, information on where the emission wavelength should occur became evident. The method of obtaining quantities proportional to the cross sections versus wavelength is outlined. A further comparison based on alternative expressions for the absorption and emission cross sections over a limited wavelength range is made. S.L.

N84-17577# General Electric Co., Syracuse, N.Y. Electronics Lab.

PULSED HETERODYNE CO2 LASER/SCANNER SYSTEM. VOLUME 1: ASSEMBLY REPORT Final Report, Sep. 1980 - Jun. 1983

G. B. Jacobs Jun. 1983 114 p

(Contract F19628-80-C-0184; AF Proj. 6670)

(AD-A135059; AFGL-TR-83-0191-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 17/9

Ten-micron heterodyne laser radar offers a new type of remote sensor that can add significantly to our characterization and understanding of the atmosphere. For example, accurate range-resolved measurements of air velocity via the Doppler of aerosol backscatter -- to distances of tens of kilometers-- will yield a better understanding of wind shear. This report is the assembly volume of a two-volume report intended to aid the government in assembling and operating the long pulse laser radar built and delivered on this contract. The equipment is intended for assembly in a trailer to be supplied by the government. It incorporates a high pulse repetition frequency, high power electron beam injection CO2 laser developed earlier by the General Electric Co. and a hemispherical scanner with a laser beam of less than 1/2000 degrees beamwidth. Author (GRA)

N84-17578# General Electric Co., Syracuse, N.Y. Electronics Lab.

PULSED HETERODYNE CO2 LASER/SCANNER SYSTEM. VOLUME 2: OPERATING INSTRUCTIONS Final Report, Sep. 1980 - Jun. 1983

G. B. Jacobs Jun. 1983 61 p

(Contract F19628-80-C-0184; AF Proj. 6670)

(AD-A135060; AFGL-TR-83-0191-Vol-2) Avail: NTIS HC A04/MF A01 CSCL 17/9

The operation volume of a two volume report is intended to aid the government in assembling and operating tho long pulse laser radar built and delivered on this contract. The equipment is intended for operation in a trailer to be supplied by the government. It incorporates a high pulse repetition frequency, high power electron beam injection CO2 laser developed by the General Electric Co. and a hemispherical scanner with a laser beam of less than 1/2000 degrees beamwidth. Author (GRA)

N84-17579# Ballistic Research Labs., Aberdeen Proving Ground, Md.

INTRACAVITY LASER EXCITATION OF NCO FLUORESCENCE IN AN ATMOSPHERIC PRESSURE FLAME Final Report

William R. Anderson, John A. Vanderhoff, Anthony J. Kotlar, Mark A. DeWilde, and Richard A. Beyer Sep. 1983 43 p

(DA Proj. 1L1-61102-AH-43)

(AD-A134740; AD-F300344; ARBRL-TR-02527) Avail: NTIS HC A03/MF A01 CSCL 21/2

Laser excited fluorescence of the NCO radical has been obtained using discrete prism selected lines of an argon ion laser pump source. To our knowledge, this is the first time NCO fluorescence has been obtained in a flame environment. NCO was formed in a slightly rich atmospheric pressure CH4/N2O flame. This flame was placed inside the extended cavity of the argon laser to take advantage of the much higher light intensity levels. All of the available laser lines pump vibrational hot bands of the NCO A doublet-sigma- plus to X doublet-pi system. The 4658 Angstom line appears to be the most useful for probing NCO densities. This line pumps from vl=1 in the X state to the lowest vibrational level of the A state. NCO is pumped to N prime = 31 by this line, probably via the Q2(31) transition although the R2(30) and P(32) transitions could not be ruled out in the present analysis. The 4658 Angstrom line was used to determine a relative NCO density profile through the reaction zone of a CH4/N2O flame. Profiles of C2, CN, and temperature were also obtained in this flame and are compared with the NCO profile. A lower limit of approximately 3x10 to the 14th power CM-3 was placed on the peak NCO density in the flame. Attempts to find NCO or CN fluorescence in a CH4/air flame failed, indicated probable differences in nitrogen chemistry for the two flames. GRA

N84-17580# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.

MODELING STUDY OF A CW HF RESONANCE TRANSFER LASER MEDIUM

M. A. Kwok and R. L. Wilkins 30 Sep. 1983 81 p

(Contract F04701-82-C-0083)

(AD-A134866; TR-0083(3603)-3; SD-TR-83-59) Avail: NTIS HC A05/MF A01 CSCL 20/5

A nonreactive kinetics model of the flowing gaseous medium of a CW HF optical resonance transfer laser (ORTL) has been developed and used to examine the prospects of this type of laser for efficient performance. Model development has required the generation of HF(v1, J1) + HF(v2, J2) V-V, R-R, T, and V-R cross section by classical trajectory calculations and by surprisal methods. These cross section packages have been validated using non-ORTL HF kinetics experiments, and the entire ORTL medium model has been validated by modeling the reported experimental results of past ORTL experiments without any adjustment of the kinetics packages. The subsequent study observing the effect on small signal gain by varying controllable parameters, such as pumping laser radiative flux and flux distribution, flow velocity, flow density, and HF mole fractions, has suggested a regime for most efficient ORTL operation, in which overall efficiency could reach 0.50. For this regime., pumping laser fluxes should exceed 5000 W/per sq cm with a spectral pattern in which most of the power is in P1(5), p1(6), p2(5), and p2(6). The medium should be operated at slightly elevated temperatures to enhance kinetic-pumping rates with characteristic velocities allowing any ORTL fluid element to remain in the pump beam no longer than 200 microsec. GRA

N84-17581# Rochester Univ., N. Y. Dept. of Chemistry.

THEORETICAL ASPECTS OF LASER-INDUCED PERIODIC SURFACE STRUCTURE FORMATION

Michael Hutchinson, Ki-Tung Lee, William C. Murphy, A. C. Beri, and Thomas F. George Nov. 1983 13 p

(Contract N00014-80-C-0472; NR Proj. 056-749)

(AD-A134875; UROCHESTER/DC/83-TR-43) Avail: NTIS HC A02/MF A01 CSCL 07/4

Laser-induced periodic pattern formation has been observed on a variety of substances. In particular, low-power laser have been used to deposit a pattern on a metal surface. For a relatively smooth surface grating, this pattern can be explained in terms of

a perturbative solution of Maxwell's equations. However, as the surface grating is enhanced by this initial deposition, the perturbation solution breaks down. An alternate non-perturbative solution of Maxwell's equations for such rough surfaces is considered here. Moreover, other possible mechanisms that may assist pattern formation are discussed, such as field-enhanced evaporation and surface migration. Author (GRA)

N84-17582# Williams Coll., Williamstown, Mass. Dept. of Physics and Astronomy.
ATOMIC HYDROGEN MASER INVESTIGATIONS OF HYDROGEN ATOM INTERACTIONS FROM 4 K TO 12 K Annual Summary Report, 1 Mar. 1983 - 29 Feb. 1984
S. B. Crampton 20 Nov. 1983 5 p
(Contract N00014-80-C-0240)
(AD-A134917; SBCONR4) Avail: NTIS HC A02/MF A01 CSCL 20/5

Techniques and data developed during previous studies of the ground state hyperfine resonance of hydrogen atoms intermittently adsorbed on molecular hydrogen surfaces are applied to the development of a Very Low Temperature Atomic Hydrogen Maser incorporating a state-selected hydrogen atom beam with thermal speeds near 5 K. Studies are made of adsorption of hydrogen atoms on molecular hydrogen and atomic neon solid surfaces at 4 K to 12 K. Author (GRA)

N84-17583# Naval Research Lab., Washington, D. C.
THE EVOLUTION OF SPONTANEOUS AND COHERENT RADIATION IN THE FREE ELECTRON LASER OSCILLATOR Interim Report
P. Sprangle, C. M. Tang, and I. Bernstein 16 Aug. 1983 40 p
(AD-A134458; NRL-MR-5110) Avail: NTIS HC A03/MF A01 CSCL 20/5

An analysis of the free electron laser (FEL) oscillator start-up problem in the linear regime is presented. The model is spatially one dimensional, though many important three dimensional effects are included heuristically. The electron beam consists of pulses of arbitrary shape separated by approximately twice the radiation transit time. The small gain/pass approximation is employed in deriving an energy rate equation, which described the evolution of the radiation pulses within the resonator. The wiggler field is assumed to occupy a portion of the finite Q resonator. In the energy rate equation, the spontaneous (incoherent) radiation term is represented by a source matrix, while the stimulated (coherent) radiation term is represented by a gain matrix. The effect of small variations in the mirror separation are investigated in the context of laser lethargy. Our analysis suggests possible methods which would substantially shorten the start-up times in FEL oscillators. Finally, our results are compared with the FEL oscillator experiments performed at Stanford University. GRA

N84-17584# Sandia Labs., Albuquerque, N. Mex.
SENSITIVITY AND ACCURACY ANALYSIS OF PULSE DIFFUSIVITY MEASUREMENTS ON LAYERED SAMPLES
J. A. Koski 1983 20 p refs Presented at the 18th Intern. Thermal Conductivity Conf., Rapid City, S.D., 3 Oct. 1983
(Contract DE-AC04-76DP-00789)
(DE84-002104; SAND-83-1141C; CONF-8310163-9) Avail: NTIS HC A02/MF A01

Measurement by the laser pulse technique of the thermal diffusivity of an unknown layer in a planar layered sample consisting of two or three materials requires knowledge of the thermal properties and thicknesses of the remaining sample layers. The sensitivity of the technique to uncertainties in the known parameters of the adjacent layers and applies the results of the sensitivity analysis to the topic of sample selection and assessment of the overall accuracy of the calculated thermal diffusivity are examined. DOE

N84-17585# California Univ., Livermore. Lawrence Livermore Lab.
RADIALLY RESOLVED SIMULATION OF A HIGH-GAIN FREE ELECTRON LASER AMPLIFIER
W. M. Fawley, D. Prosnitz, S. Doss, and R. Gelinas 27 Jun. 1984 18 p refs Presented at the 4th Workshop on Free-Electron Laser Devices, Eastsound, Wash., 27 Jun. - 1 Jul. 1983 Prepared in cooperation with Science Applications, Inc., Pleasanton, Calif.
(Contract W-7405-eng-48; DARPA Order 4856)
(DE84-003751; UCRL-89215; CONF-8306121-5) Avail: NTIS HC A02/MF A01

The results of a two-dimensional simulation of a high-gain free electron laser (FEL) amplifier are presented. The simulation solves the inhomogeneous paraxial wave equation. The source term is radially resolved and is obtained by tracking the interaction of the laser field with localized macroparticles. DOE

N84-17586# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
DISTANCE MEASUREMENT TO LINE OF SIGHT OBSTACLES CLOSE TO ROADS, A COMMISSION FROM STATENS VAEG OCH TRAFIKINSTITUTE (VTI)
Goeran Bolander Jul. 1983 22 p In SWEDISH; ENGLISH summary
(FOA-C-30333-E1; ISSN-0347-3708) Avail: NTIS HC A02/MF A01; Research Inst. of National Defence, Stockholm KR50

A method for measuring distance to line of sight obstacles close to roads, up to 50 m, with a continuous wave laser and a charge coupled photodiode array was tested. The method cannot be used up to the desired distance because of radiation safety threshold values for eyes, but works well at distances not exceeding 6 m. Author (ESA)

N84-17587# Conference of Radiation Control Program Directors, Inc., Rockville, Md.
SUGGESTED STATE REGULATIONS FOR CONTROL FO RADIATION. VOLUME 2: NONIONIZING RADIATION, LASERS
1982 81 p Sponsored in part by FDA
(PB84-109669; HHS/PUB/FDA-83-8220; FDA/NCDRH-84/6) Avail: NTIS HC A05/MF A01 CSCL 06R

Information is presented on classifying lasers into four classes is presented; defines what a laser product is; states requirements for medical surveillance for persons exposed to laser radiation; specifies requirements for registration of laser facilities, mobile lasers, and persons servicing lasers/systems. Author

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N84-17588# British Library Lending Div., Boston Spa (England).
DISTRIBUTION OF UNIT PRESSURES IN UNIVERSAL SPINDLE JOINT
A. P. Potapenkov and E. B. Kasperovich 30 Nov. 1983 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Chernaya Met. (USSR), no. 4, 1983 p 132-136
Avail: British Library Lending Div., Boston Spa, Engl.

The distribution of unit pressures on the working surface of the bushing of a universal spindle joint was examined with account taken of only the assembly gaps. Then account was taken of the assembly gaps plus gaps resulting from wear of the flat working surface of the bushing. S.L.

N84-17589# British Library Lending Div., Boston Spa (England).
OPTIMAL ELECTRIC DRIVE CONTROL TO SUPPRESS JERKING
A. N. Popov and I. V. Frantsenyuk [1983] 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 3, 1983 p 128-132
(BLL-M-35391-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The optimal diagram of the speed of the electric drive adjusted to limit jerkin is described by a catenary curve with conjugate parabolic curve segments corresponding to the beginning and end

of the work period. The effectiveness of the optimal (as regards minimum loss) control of the electric drive to limit jerking is greatest with a low productivity and decreases with increase in the latter.
Author

N84-17590*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF DIFFERENT RUB MODELS ON SIMULATED ROTOR DYNAMICS
Albert F. Kascak and John J. Tomko Feb. 1984 12 p refs Presented at the ASME Appl. Mech., Bioeng., and Fluids Eng. Conf., Houston, Tex., 20-22 Jun. 1983 Prepared in cooperation with Army Research and Technology Labs., Cleveland
(NASA-TP-2220; E-1801; NAS 1.60:2220; AFSCOM-TR-83-C-8) Avail: NTIS HC A02/MF A01 CSCL 13I

Using a direct integration, transient response rotor dynamics computer code, the response of turbine engine rotors to two different blade tip - seal interference rub models was studied. The first model, an abradable seal rub model, is based on an energy-loss-per-unit-volume theory (applicable to a ceramic turbine blade tip seal). The second, a smearin model, is based on viscous hydrodynamic theory (applicable to a metallic blade tip seal). The results from these two models were compared with those from a previously studied model based on dry friction theory. The abradable model was very senitive to small changes in the energy per unit volume, and once a threshold was exceeded, the rotor went into a backward whirl. The amplitude seemed to grow without limit. This was similar to the dry friction model when the coefficient of friction exceeded a particular threshold. The smearing model was not as sensitive to small changes in the viscosity, but a threshold viscosity was found. When it was exceeded, the rotor went into backward whirl, but the amplitude seemed to grow to a finite limit.
Author

N84-17591*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE BALL BEARING AS A RHEOLOGICAL TEST DEVICE
Edward Kingsbury (Draper, Charles S. Lab.) 1984 13 p refs Presented at the 10th Leeds-Lyon Symp. on Tribology, Lyon, 6-9 Sep. 1983
(NASA-TM-83570; NAS 1.15:83570; E-1814) Avail: NTIS HC A02/MF A01 CSCL 13I

An angular-contact ball bearing provides an easily obtainable, precise mechanical system for rheological tests on thin films under high pressure. The test conditions are by definition similar to those found in practice. Accessible independent variables include size, pressure, bulk temperature, roughness, adsorbed surfactant, fluid type, fluid quantity, fluid supply rate, film thickness, entrainment velocity, transit time, and combined strain. Easily measured or inferred variables include slip, changes in film thickness with time (transients), strain rate, lubricant elastic modulus (thin film, high pressure), tractive force, lubricant chemical degradation rate, and lubricant degradation product. Methods for setting and obtaining these quantities in a bearing are discussed, together with experimental limitations on them.
Author

N84-17592*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HYDRODYNAMIC LUBRICATION OF RIGID NONCONFORMAL CONTACTS IN COMBINED ROLLING AND NORMAL MOTION
Mihir K. Ghosh (Banaras Hindu Univ.), Bernard J. Hamrock, and David E. Brewe 1984 28 p refs Proposed for presentation at the Joint Lubrication Conf., San Diego, Calif., 22-24 Oct. 1984; sponsored by ASME and American Society of Lubrication Engineers Prepared in cooperation with Army Research and Technology Labs., Cleveland
(NASA-TM-83578; E-1926; NAS 1.15:83578; AVRADCOM-TR-84-C-2) Avail: NTIS HC A03/MF A01 CSCL 13I

A numerical solution to the problem of hydrodynamic lubrication of rigid point contacts with an isoviscous, incompressible lubricant was obtained. The hydrodynamic load-carrying capacity under unsteady (or dynamic) conditions arising from the combined effects of squeeze motion superposed upon the entraining motion was determined for both normal approach and separation. Superposed normal motion considerably increases net load-carrying capacity during normal approach and substantially reduces net load-carrying capacity during separation. Geometry was also found to have a significant influence on the dynamic load-carrying capacity. The ratio of dynamic to steady state load-carrying capacity increases with increasing geometry parameter for normal approach and decreases during separation. The cavitation (film rupture) boundary is also influenced significantly by the normal motion, moving downstream during approach and upstream during separation. For sufficiently high normal separation velocity the rupture boundary may even move upstream of the minimum-film-thickness position. Sixty-three cases were used to derive a functional relationship for the ratio of the dynamic to steady state load-carrying capacity in terms of the dimensionless normal velocity parameter (incorporating normal velocity, entraining velocity, and film thickness) and the geometry parameter.
M.G.

N84-17593# Metaalinstitut TNO, Apeldoorn (Netherlands). Dept. of Surface Treatment and Tribology.
STUDY OF THE LUBRICATION MECHANISM OF THIN FILM LUBRICATED CONCENTRATED STEEL CONTACTS. THE INFLUENCE OF PRE-TREATMENT OF THE STEEL ON THE LOAD CARRYING CAPACITY Final Technical Report, Apr. 1982 - Sep. 1983
A. Begelinger and A. W. J. de Gee Sep. 1983 8038 p
(Contract DAJA37-82-C-0465)
(AD-A135067) Avail: NTIS HC A03/MF A01 CSCL 11/8

The effect of the thermochemical surface treatments carburizing, ion-nitriding and liquid-nitriding on the load carrying capacity at high speed (4 m/s) of sliding crossed cylinders of steel, thin film lubricated with a marine diesel engine oil of 60 C, is described for three values of running-in distance, namely 0 m, 30 m and 300 m; running-in being performed at a speed of 0.1 m/s. It is shown that when using untreated surfaces of ball bearing steel 100 Cr 61), carburized surfaces or ion-nitrided surfaces, loading in excess of a critical load value FNc causes a transition from partial elastohydrodynamic lubrication to unlubricated contact (scuffing regime). When using liquid-nitrided surfaces, loading in excess of FNc leads to a transition from partial EHD lubrication of boundary lubrication. This shows that liquid-nitriding considerably increases the upper limit of the temperature range in which boundary lubrication is possible.
GRA

N84-17594# Ford Motor Co., Dearborn, Mich. Research Staff.
TIME-TEMPERATURE STUDIES OF HIGH TEMPERATURE DETERIORATION PHENOMENA IN LUBRICANT SYSTEMS: SYNTHETIC ESTER LUBRICANTS Final Report, 1 May 1980 - 30 Apr. 1983
S. Korcek, L. R. Mahoney, R. K. Jensen, M. Zinbo, and P. A. Willermet Sep. 1983 214 p
(Contract F49620-80-C-0061; AF Proj. 2303)
(AD-A135464; AFOSR-83-0987TR) Avail: NTIS HC A10/MF A01 CSCL 11/8

Kinetic and mechanistic investigations of the effects of oxygen pressure on liquid phase autoxidation reactions in model lubricants at elevated temperatures were carried out with n-hexadecane at 160 to 190 C and at oxygen pressures from 4 to 120 kPa. Resultes of these investigations showed that intramolecular alpha, gamma and alpha, delta hydrogen abstraction reactions of peroxy radicals are highly reversible and that the intermediate hydroperoxyalkyl radicals formed from these abstractions, besides addition of oxygen and reverse intramolecular hydrogen abstraction (isomerization) reactions, undergo cyclization reactions leading to formation of cyclic ether products. A general reaction scheme for autoxidation of any system containing alkyl chains with carbon number greater than four is proposed. Absolute rate constants for formation, isomerization, and cyclization of hydroperoxyalkyl radicals have been determined for the first time for liquid-phase autoxidation and the corresponding Arrhenius parameters have been derived. Their values are in general agreement with those previously determined or estimated in gas phase combustion studies. Results

of kinetic analysis of cleavage product formation are consistent with two modes of their formation in the entire range of oxygen pressures studied. The first mode involves decomposition of alpha, gamma hydroperoxyketone species and the second reactions of alkoxy radicals. GRA

N84-17595# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
PRECISION FLEXIBLE MACHINING CELLS WITHIN A MANUFACTURING SYSTEM Interim Report
M. R. Cutkosky, P. S. Fussell, and R. Milligan, Jr. Mar. 1983 48 p
(AD-A134864; CMU-RI-TR-83-2) Avail: NTIS HC A03/MF A01 CSCL 13/8

This report discusses the conceptual design of a manufacturing cell for a small-batch manufacturer. The cell produces precision parts with a minimum of machining equipment. The cell design emphasizes near-term technology and uses off the shelf items where possible. The proposed cell can run unattended for a moderate period of time (eg. over-night). The design philosophy is to treat the cell components and control programs as discrete modules in a hierarchy. The resulting cell is easily integrated into a larger system. It is also readily modified or expanded as more sophisticated equipment and techniques becomes available. GRA

N84-17596# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
FLEXIBLE CONFORMABLE CLAMPS FOR A MACHINING CELL WITH APPLICATIONS TO TURBINE BLADE MACHINING Interim Report
E. Kurokawa May 1983 34 p
(AD-A134942; CMU-RI-TR-83-16) Avail: NTIS HC A03/MF A01 CSCL 09/2

A flexible, conformable clamping scheme for a steam turbine blade machining cell is discussed. Experiments that have been carried out to investigate the clamping efficiency of this novel design are also described. Flexible fixtures for turbine blade machining have been developed and installed to demonstrate the reduction of human intervention for workpiece setup in the laboratory at Carnegie-Mellon University. The key features of the clamp design and the cell configuration are described. Subsequently, the theory of vibration is reviewed and the experimental results of damped natural frequencies of the clamped blade are presented. For future research a cell model may be established and simulated. Improvements in the clamp mechanism and an intensive study of vibration are also expected. Author (GRA)

N84-17597# Oak Ridge National Lab., Tenn.
DIESEL FUEL EXTENDERS AND SUBSTITUTES
W. L. Griffith and A. I. Compere 1983 10 p refs Presented at the Energy Resource Management, San Francisco, 23 Aug. 1983 (Contract W-7405-eng-26)
(DE84-003402; CONF-830847-7) Avail: NTIS HC A02/MF A01

Several technologies for augmenting fuel oils were demonstrated. The simplest of these is the direct use of vegetable oils as an extender of diesel fuels. It was found that the use of vegetable oils as a direct diesel fuel replacement or extender in field tractors was unsatisfactory. Methods for using ethanol in diesel engines, such as macroemulsions and vaporization/ventilation were also tested. For the most part, diesel fuel augmentation with these renewable resource materials was not effective in current equipment. There is a considerable need to develop and provide appropriate fuel oil augmentation methods to developing countries for renewable resource technology. DOE

N84-17598# Michigan Univ., Ann Arbor. Inst. for Transportation Research.
DYNAMIC BEHAVIOR OF NONUNIFORM TIRE/WHEEL ASSEMBLIES
Thomas D. Gillespie Nov. 1983 57 p refs
(MVMA Proj. 1161)
(PB84-125541; UMTRI-83-8) Avail: NTIS HC A04/MF A01 CSCL 13F

Nonuniformities in the rotating tire and wheel components of a motor vehicle which may excite ride vibrations are discussed. Both the vehicle and the wheel assembly are dynamic systems that interact via the forces and motions produced. Measurement of the force variation inherent to a nonuniform tire/wheel assembly in a meaningful way therefore requires a basic understanding of the dynamic systems involved. Impedance methods are employed to formulate a dynamic model for a nonuniform tire/wheel assembly and a loading system that can represent either a test machine or a motor vehicle. The models are used to explain the potential error sources that may arise in tire uniformity tests on a machine that has dynamic response in the range of interest. GRA

N84-17599# Environmental Protection Agency, Ann Arbor, Mich. Control Technology Assessment and Characterization Branch.
AN ANALYSIS OF CARBON MONOXIDE EMISSIONS AS A FUNCTION OF AMBIENT TEMPERATURE AND VEHICLE PARAMETERS
Larry C. Landman Jul. 1983 63 p refs
(PB84-103829; EPA-AA-CTAB/TA-83-6) Avail: NTIS HC A04/MF A01 CSCL 13B

An analysis of existing data on 16 vehicles in EPA's Controlled Environmental Test Facility is presented. The analyses indicate that cold weather carbon monoxide (CO) emissions appear to depend most on fuel metering type, with the carbon monoxide emissions of the carburated vehicles being more sensitive to temperature changes than those of the fuel injected vehicles. Also, it is easier to predict the differences in carbon monoxide emissions (cold minus hot) versus temperature than it is to predict the ratio ('cold' divided by hot). Since the sample was small and not representative of all emission control systems, the results might not apply to all vehicles. GRA

N84-17611# Argonne National Lab., Ill. Components Technology Div.
LEAKAGE FLOW-INDUCED VIBRATIONS OF REACTOR COMPONENTS
T. M. Mulcahy *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 15, No. 9 Sep. 1983 p 11-18 refs (For primary document see N84-17609 08-39)
(Contract W-31-109-eng-38)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 11A

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N84-17600# Council for Scientific and Industrial Research, Pretoria (South Africa). Production Engineering Advisory Service.
MINI-SEMINAR ON QUALITY ASSURANCE
Nov. 1982 64 p refs Seminar held in Pretoria, 21 Mar., 22 Apr., 29 Jun., 7 Sep., and 26 Oct. 1983 and in Johannesburg, 25 May and 31 Aug. 1983 and in Port Elizabeth, South Africa, 27 Jul. 1983
(CSIR-TSD-0008/82; ISBN-0-7988-2364) Avail: NTIS HC A04/MF A01

Items discussed at a conferences on quality assurance in production engineering are presented. The following topics were presented: quality circles, management information system, industrial training, value engineering, finishing techniques, CAD/CAM, productivity improvement, and nondestructive testing. For individual titles, see N84-17601 through N84-17605.

N84-17601# Council for Scientific and Industrial Research, Pretoria (South Africa).
QUALITY MANAGEMENT IN PROCUREMENT
T. D. Zeederberg (Lyttleton Engineering Works (Pty) Ltd.) *In its* Mini-Seminar on Quality Assurance Nov. 1982 4 p (For primary

document see N84-17600 08-38)
Avail: NTIS HC A04/MF A01

Quality control and procurement in financial management are discussed. Some required skills are outlined: manufacturing technology, backed up by process design and manufacturing planning; procurement capability; product support; and economically viable methods to satisfy the needs. E.A.K.

N84-17602# South African Bureau of Standards, Pretoria. Mechanical Engineering Dept.
MANAGEMENT INPUT IN QUALITY
In CSIR Mini-Seminar on Quality Assurance Nov. 1983 11 p refs (For primary document see N84-17600 08-38)
Avail: NTIS HC A04/MF A01

Quality assurance, its importance and meaning to management are outlined. It is suggested that motivation of management to accept quality assurance programs and to understand them is to accept that these systems do also start with management. E.A.K.

N84-17603# Council for Scientific and Industrial Research, Pretoria (South Africa).
DESIGN QA ON A SMALL BATCH PROJECT
H. W. Griffiths (TUV-Rheinland (SA) (Pty) Ltd.) *In its* Mini-Seminar on Quality Assurance Nov. 1982 5 p (For primary document see N84-17600 08-38)
Avail: NTIS HC A04/MF A01

Quality assurance design stages of a one off project are described. The tasks of the project manager are outlined. The need for quality assurancy during design and development stages is emphasized. E.A.K.

N84-17604# National Electrical Engineering Research Inst., Pretoria (South Africa). Semi-Conductor Technology Div.
ENVIRONMENTAL FACTORS AS A SOURCE OF FAILURE IN INTEGRATED CIRCUITS
M. Crooke *In* CSIR Mini-Seminar on Quality Assurance Nov. 1982 15 p refs (For primary document see N84-17600 08-38)
Avail: NTIS HC A04/MF A01

Two of the difficulties facing the manufacturer in achieving yield optimization are outlined. The magnitude of the problem is indicated. If the minimum acceptable yield of integrated circuits (IC) is 40% what is the average quality per manufacturing stage to obtain this yield if there are 45 processing stages which can most seriously influence the yield disregarding all handling steps and chemical, gas and water purity considerations. This can be determined by mathematical equation. It is shown that particulate matter control will become a critical factor in IC yield optimization. E.A.K.

N84-17605# GEC Machines Proprietary Ltd. Foundry (England).
MEASURING QUALITY ACHIEVEMENTS
D. A. Hynd *In* CSIR Mini-Seminar on Quality Assurance Nov. 1982 16 p refs (For primary document see N84-17600 08-38)
Avail: NTIS HC A04/MF A01

The effectiveness of a quality within an organization must be capable to be measured in a consistent manner, to provide evidence of improvement is outlined. Areas of weakness in the organization which will benefit most from the application of corrective measures are indicated. Quality costing and product quality are two techniques which may provide the necessary data to indicate to management the progress. The basis for future quality planning strategy are outlined. E.A.K.

N84-17606*# Cleveland State Univ., Ohio. Coll. of Engineering.
PRELIMINARY INVESTIGATION OF AN ELECTRICAL NETWORK MODEL FOR ULTRASONIC SCATTERING Final Report
James E. Maisel Washington NASA Jan. 1984 46 p refs
(Contract NAG3-362)
(NASA-CR-3770; E-1895; NAS 1.26:3770) Avail: NTIS HC A03/MF A01 CSCL 14D

The behavior of acoustic attenuation in a solid is related to the electrical transmission line model where the electrical shunt conductance, which is frequency dependent, represents the loss due to the scattering sites in the solid. Results indicate that the absolute value of attenuation at a given frequency depends on both the normalized mean square deviation of the density and bulk modulus of the scattering sites from the ambient medium and the spatial scattering correlation function. Besides establishing the absolute value of attenuation, the spatial correlation function determines the attenuation profile as a function of frequency. S.L.

N84-17607# Johns Hopkins Univ., Baltimore, Md. Dept. of Electrical Engineering and Computer Science.
TESTABILITY OF INTERCONNECTION STRUCTURES Final Technical Report
G. G. L. Meyer 30 Nov. 1983 18 p
(Contract N00014-80-C-0772)
(AD-A135431; JHU/EECS-83/18) Avail: NTIS HC A02/MF A01 CSCL 14/2

The goal of this research effort was to analyze the relationships between system structure and testability. This final report describes the approach that was followed to relate structure and testability and presents the results that were obtained. GRA

N84-17608# Battelle Columbus Labs., Ohio.
QUALITY ASSURANCE OF HEAT-FUSED POLYETHYLENE PLASTIC PIPE JOINTS, PHASE 2 Annual Report, Feb. 1982 - Apr. 1983
L. House, A. Lustiger, R. Hyatt, M. Cassady, and R. Smith Sep. 1983 123 p
(PB84-104942; GRI-81/0199) Avail: NTIS HC A06/MF A01 CSCL 13B

A simple and reliable, field grade instrument for nondestructively determining the quality of heat fused, butt joints in polyethylene pipe was developed. Phase 1 of the program, carried out in 1981, successfully demonstrated the capability of the ultrasonic pulse echo concept to detect voids, inclusions, lack of bond, and incomplete fusion. The objective for 1982, based on the Phase 1 proof of principle results, was to design, fabricate, and evaluate a laboratory prototype of a field system for nondestructive inspection of 4 inch diameter polyethylene pipe. GRA

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N84-17609# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 15, NO. 9
J. Nagle-Eshleman Sep. 1983 97 p refs
(AD-A134750; AD-E000550) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Squeeze-film damping of rotor-dynamic systems, and leakage flow-induced vibrations of reactor components are discussed. For individual titles, see N84-17610 through N84-17611.

N84-17610# Sussex Univ., Brighton (England). School of Engineering and Applied Science.
SQUEEZE-FILM DAMPING OF ROTOR-DYNAMIC SYSTEMS
M. Dogan and R. Holmes *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 15, No. 9 Sep. 1983 p 3-9 refs (For primary document see N84-17609 08-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

The roles of the squeeze-film damper when used in parallel with a flexible element in a vibration isolator and when used in a series with flexible pedestals or the frame of a rotor-dynamic system are reviewed. Author

N84-17611# Argonne National Lab., Ill. Components Technology Div.

LEAKAGE FLOW-INDUCED VIBRATIONS OF REACTOR COMPONENTS c37
T. M. Mulcahy *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 15, No. 9 Sep. 1983 p 11-18 refs (For primary document see N84-17609 08-39)
(Contract W-31-109-eng-38)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 11A

Secondary flows through narrow gaps in reacto component supports, which are much smaller than but parallel to the primary coolant flow, occasionally are the excitation source for significant flow-induced vibrations. These so-called leakage flow problems are reviewed for the purpose of identifying design features and excitation sources that should be avoided. Author

N84-17612# British Library Lending Div., Boston Spa (England).
STRESS-STATE INDEX AND NADAI-LODE PARAMETER
N. A. Chelyshev, V. Ya. Lyuts, and G. A. Chervov [1983] 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 4, 1983 p 50-53
(BLL-M-35433-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The functional relations of the stress-state index and the Nadai-Lode parameter in the plane stress state are established and confirmed experimentally. Author

N84-17613 British Library Lending Div., Boston Spa (England).
INTEGRATED EVALUATION OF TENSILE STRENGTHS AND DUCTILITY LIMITS
A. A. Vainshtein and V. S. Borovikov 19 Dec. 1983 4 p refs Transl. into ENGLISH from Izv. (USSR) p 156-157
(BLL-M-35452-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The guaranteed levels of values of metal strength and deformation is found using the laws of probability. Test and calculated results agree. Author

N84-17614 Michigan State Univ., East Lansing.
SOME TOPICS IN FINITE ELASTICITY Ph.D. Thesis
Abdol Hossein Jafari 1983 95 p
Avail: Univ. Microfilms Order No. DA8324733

An analytic approach for obtaining bounds on stress concentration factors in the theory of finite anti-plane shear is presented. The problem of an infinite slab with a traction free elliptical cavity subjected to a remotely applied finite simple shear deformation is considered. It is assumed that the slab is composed of a homogeneous incompressible elastic material. Explicit estimates are obtained for the stress concentration factor in terms of the dimensions of the cavity, the applied stress and the constitutive parameters. The limiting cases in which the cavity is circular or crack shaped are also examined. The analysis is based on the application of maximum principles for second order uniformity elliptic quasilinear partial differential equations. The finite plane strain deformation of a circular tube of homogeneous compressible elastic material of harmonic type. Subjected to simultaneous internal and external pressure is considered. Dissert. Abstr.

N84-17615*# Failure Analysis Associates, Palo Alto, Calif.
RECOMMENDATIONS FOR FUTURE RESEARCH ON FRACTURE MECHANICS LIFE TECHNOLOGY Final Report
J. M. Thomas, P. M. Besuner, and D. O. Harris Sep. 1983 21 p (Contract NAS8-34746)
(NASA-CR-170904; NAS 1.26:170904; FME-R-1G/9693; FaAA-83-9-8) Avail: NTIS HC A02/MF A01 CSCL 20K

Recommendations for research efforts to improve the predictive capabilities of fracture mechanics for hydrogen/oxygen rocket engine components are advanced. Existing technology can be improved in the areas of software development and in the generation of stress intensity factor solutions and examples of software utilization. Additional test results are needed for material/environment combinations; variable amplitude loading; and the transition behavior of part-through cracks. Gaps in existing technology can be filled through the development of subcritical crack growth models; the integration of crack initiation analysis with fracture mechanics; the introduction of residual stress and assembly stresses; and expanded use of probabilistic fracture mechanics. Proof testing procedures need to be optimized. Technology expansion is indicated to generalize the J-integral; explore cyclic plasticity-fatigue crack growth interfaces; and enhance understanding of transient creep crack growth. A.R.H.

N84-17616*# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
THREE-DIMENSIONAL MEASUREMENTS OF FATIGUE CRACK CLOSURE Semiannual Status Report
A. F. Grandt, Jr. Feb. 1984 19 p refs
(Contract NAG1-321)
(NASA-CR-175366; NAS 1.26:175366) Avail: NTIS HC A02/MF A01

Three dimensional fatigue crack opening profiles in transparent polymer test specimens were determined. The load required to separate crack faces was measured along the crack profile at various positions through the specimens thickness. Crack opening loads at the specimen surface (under plane stress conditions) were compared with measurements made under plane strain conditions the specimen interior. The fatigue crack opening load was correlated with fatigue crack retardation behavior caused by peak overloads, and the results discussed in terms of three dimensional aspects of the fatigue crack closure mechanism for fatigue crack retardation. S.L.

N84-17617*# Lehigh Univ., Bethlehem, Pa.
A CYLINDRICAL SHELL WITH A STRESS-FREE END WHICH CONTAINS AN AXIAL PART-THROUGH OR THROUGH CRACK
F. Erdogan and O. S. Yahsi Dec. 1983 51 p refs
(Grants NGR-39-007-011; NSF MEA-82-09083)
(NASA-CR-173290; NAS 1.26:173290) Avail: NTIS HC A04/MF A01 CSCL 20K

The interaction problem of a through or a part through crack with a stress free boundary in a semi-infinite cylindrical shell is considered. It is assumed that the crack lies in a meridional plane which is a plane of symmetry with respect to the external loads as well as the geometry. The circular boundary of the semi-infinite cylinder is assumed to be stress free. By using a transverse shear theory the problem is formulated in terms of a system of singular integral equations. The line spring model is used to treat the part through crack problem. In the case of a through crack the interaction between the perturbed stress fields due to the crack and the free boundary is quite strong and there is a considerable increase in the stress intensity factors caused by the interaction. On the other hand in the problem of a surface crack the interaction appears to be much weaker and consequently the magnification in the stress intensity factors is much less significant. S.L.

N84-17618*# Lehigh Univ., Bethlehem, Pa.
A PRESSURIZED CYLINDRICAL SHELL WITH A FIXED END WHICH CONTAINS AN AXIAL PART-THROUGH OR THROUGH CRACK
O. S. Yahsi and F. Erdogan Dec. 1983 47 p refs
(Grants NGR-39-007-011; NSF MEA-82-09083)
(NASA-CR-173291; NAS 1.26:173291) Avail: NTIS HC A03/MF A01 CSCL 20K

A cylindrical shell having a very stiff and plate or a flange is considered. It is assumed that near the end the cylinder contains an axial flaw which may be modeled as a part through surface crack or a through crack. The effect of the end constraining on the stress intensity factor which is the main fracture mechanics parameter is studied. The applied loads acting on the cylinder are assumed to be axisymmetric. Thus the crack problem under consideration is symmetric with respect to the plane of the crack and consequently only the Mode 1 stress intensity factors are nonzero. With this limitation, the general perturbation problem for a cylinder with a built in end containing an axial crack is considered. Reissner's shell theory is used to formulate the problem. The part through crack problem is treated by using a line spring model. In

the case of a crack tip terminating at the fixed end it is shown that the integral equations of the shell problem has the same generalized Cauchy kernel as the corresponding plane stress elasticity problem. S.L.

N84-17619*# Lehigh Univ., Bethlehem, Pa.
TRANSIENT THERMAL STRESSES IN A REINFORCED HOLLOW DISK OR CYLINDER CONTAINING A RADIAL CRACK
Renji Tang and F. Erdogan Jul. 1983 31 p refs
(Grant NGR-39-007-011)
(NASA-CR-173292; NAS 1.26:173292) Avail: NTIS HC A11/MF A01 CSCL 20K

The transient thermal stress problem in a hollow cylinder or a disk containing a radial crack is considered. It is assumed that the cylinder is reinforced on its inner boundary by a membrane which has thermoelastic constants different than those of the base material. The transient temperature, thermal stresses and the crack tip stress intensity factors are calculated in a cylinder which is subjected to a sudden change of temperature on the inside surface. The results are obtained for various dimensionless parameters and material constants. The special cases of the crack terminating at the cylinder-membrane interface and of the broken membrane are separately considered and some examples are given. M.G.

N84-17620*# Kansas Univ. Center for Research, Inc., Lawrence.
DEVELOPMENT OF A THERMAL AND STRUCTURAL MODEL FOR A NASTRAN FINITE-ELEMENT ANALYSIS OF A HYPERSONIC WING TEST STRUCTURE Final Report
Jaap Lameris 1984 268 p refs
(Grant NsG-4008)
(NASA-CR-170413; NAS 1.26:170413; H-1219) Avail: NTIS HC A12/MF A01 CSCL 20K

The development of a thermal and structural model for a hypersonic wing test structure using the NASTRAN finite-element method as its primary analytical tool is described. A detailed analysis was defined to obtain the temperature and thermal stress distribution in the whole wing as well as the five upper and lower root panels. During the development of the models, it was found that the thermal application of NASTRAN and the VIEW program, used for the generation of the radiation exchange coefficients, were deficient. Although for most of these deficiencies solutions could be found, the existence of one particular deficiency in the current thermal model prevented the final computation of the temperature distributions. A SPAR analysis of a single bay of the wing, using data converted from the original NASTRAN model, indicates that local temperature-time distributions can be obtained with good agreement with the test data. The conversion of the NASTRAN thermal model into a SPAR model is recommended to meet the immediate goal of obtaining an accurate thermal stress distribution. A.R.H.

N84-17621*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A FINITE DIFFERENCE SCHEME FOR THE EQUILIBRIUM EQUATIONS OF ELASTIC BODIES Final Report
T. N. Phillips and M. E. Rose Jan. 1984 32 p refs
(Contract NAS1-17070)
(NASA-CR-172293; ICASE-84-2; NAS 1.26:172293) Avail: NTIS HC A03/MF A01 CSCL 20K

A compact difference scheme is described for treating the first-order system of partial differential equations which describe the equilibrium equations of an elastic body. An algebraic simplification enables the solution to be obtained by standard direct or iterative techniques. M.G.

N84-17622*# Failure Analysis Associates, Palo Alto, Calif.
A REVIEW OF FRACTURE MECHANICS LIFE TECHNOLOGY Final Report
P. M. Besuner, D. O. Harris, and J. M. Thomas Sep. 1983 411 p refs
(Contract NAS8-34746)
(NASA-CR-170903; NAS 1.26:170903; FaAA-83-3-11; FME-R-1/9693) Avail: NTIS HC A18/MF A01 CSCL 20K

The current state of fracture mechanics-based analytical tools applicable to modeling and forecasting the subcritical fatigue crack growth in structures is reported. The advantages of the linear elastic fracture mechanics approach over the S-N approach are considered. Topics covered include: elastic stress analysis of cracks; supercritical growth of cracks; nonlinear fracture mechanics; residual stresses; thermal stresses; probabilistic fracture mechanics; proof test criteria for tough ductile materials exhibiting stable flaw growth; and weld cracks. A.R.H.

N84-17623# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structural Integrity Branch.
USE OF SMALL CRACK DATA TO BRING ABOUT AND QUANTIFY IMPROVEMENTS TO AIRCRAFT STRUCTURAL INTEGRITY Final Report, Jan. 1981 - Oct. 1982
J. M. Potter and B. G. W. Yee Sep. 1983 18 p
(AF Proj. 2401)
(AD-A135012; AFWAL-TR-83-3096) Avail: NTIS HC A02/MF A01 CSCL 01/3

Crack growth information has been used in ways to quantitatively evaluate and predict damage tolerance and slow crack growth life limits of structures. Recent advances in the area of crack growth at small crack sizes (less than one millimeter) have enabled increasingly quantitative studies into the specific mechanisms that affect initiation and growth at structural details. As an example, through the use of small crack data the USAF/General Dynamics study on 'Fastener Hole Quality' was able to identify a manufacturing-related problem causing short structural lives, propose a modification to shop equipment, and quickly and specifically evaluate the resultant flaw growth improvement. The purpose of this paper is to describe the general procedures used in the derivation of small crack data and to present growth data for different structural manufacturing methods. The data will be presented in terms of equivalent initial flaw size populations, crack growth rate, and initiation life to a specific length for fractographically measured cracks within the range of .01 to 1 millimeter in length. Procedures will be discussed to utilize the small crack data from developing and verifying changes in fastener systems and manufacturing methods for improving the fatigue performance of aircraft structures. GRA

N84-17624# Texas A&M Univ., College Station. Dept. of Mathematics.
[FRACTURE AND CONTACT PROBLEMS FOR LINEARLY VISCOELASTIC MATERIAL]
J. R. Walton 25 Apr. 1983 4 p
(Grant AF-AFOSR-0152-82; AF Proj. 2304)
(AD-A135111; AFOSR-83-0949TR) Avail: NTIS HC A02/MF A01 CSCL 11/9

This report summarizes progress on certain theoretical questions arising in the study of dynamic and quasi-static fracture and contact problems for linearly viscoelastic material. Specifically, results for two classes of problems are described: Determining the angular dependence of the stress field in front of a dynamically propagating Mode III semi-infinite crack in an infinite general linearly viscoelastic body; Determining the stresses, displacements and friction coefficient for the quasi-static problem of a rigid indentor sliding with Coulomb friction over the surface of a power-law inhomogeneous linearly viscoelastic half-plane. Author (GRA)

N84-17625# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
A FUNCTIONAL STRESS INTENSITY APPROACH TO MULTIPLY CRACKED, PARTIALLY AUTOFRETTAGED CYLINDERS Final Report
S. L. Pu Jun. 1983 28 p Presented at Conf. of Army Math., Bethesda, Md. 28-30 Jun. 1982
(DA Proj. 1L1-61102-AH-60)
(AD-A135345; AD-E440201; ARLCB-TR-83024) Avail: NTIS HC A03/MF A01 CSCL 20/11

The functional stress intensity approach is presented for a partially autofrettaged, thick-walled cylinder. This approach is a combination of a series of methods developed for the computation

of stress intensity factors for multiple-radial cracks emanating from the inner or the outer surface of a hollow cylinder. The numerical method is mainly based on the finite element method using 12-node quadrilateral, isoparametric elements with singular elements around a crack tip. The difficulty due to the presence of initial stresses in the finite element method is obviated by the method of thermal simulation which replaces the residual stresses existing in an autofrettaged cylinder by an active thermal load. The weight function method is incorporated to reduce the repeated computations of stress intensity factors of the same geometrical configuration subjected to various external loads and residual stresses. The functional stress intensity factor is introduced to overcome the difficulty in seeking the weight function itself. Numerical results of functional stress intensity factors are given for multiple cracks radiating from the bore or from the outer surface of a cylinder having an external diameter twice that of an internal diameter. A linear superposition of these results gives the resultant stress intensity factor of a cracked geometry subjected to combined external loads and initial stresses. It is highly possible to extend the method outlined in this report for elastic-perfectly plastic material to strain-hardening materials. GRA

N84-17626# Johns Hopkins Univ., Baltimore, Md. Dept. of Materials Science and Engineering.

ACOUSTIC EMISSION DETERMINATION OF DEFORMATION MECHANISMS LEADING TO FAILURE OF NAVAL ALLOYS, VOLUME 1 Final Report, 27 Dec. 1979 - 27 Dec. 1982

J. T. Glass, S. Majerowicz, and R. E. Green, Jr. May 1983 163 p 2 Vol.

(Contract N00024-80-C-5337)

(AD-A135387; DTNSRDC/SME-CR-18-83-Vol-1) Avail: NTIS HC A08/MF A01 CSCL 20/11

In this investigation the acoustic emission behavior of three Naval alloy steels (HY 80, HY 100 and HY 130) was characterized during tensile elongation and bend type loading. The detection of emissions was accomplished using a very new, state of the art interferometer as well as with a unique piezoelectric transducer. The deformation and fracture of these HY steels was documented via optical and scanning electron microscopy and was correlated with observed emissions in order to determine the generating mechanisms. All three steels investigated were found to exhibit very similar deformation and fracture modes despite a slight difference in microstructures. They also exhibited identical acoustic emission behavior within statistical variances. Their fracture consisted of a very ductile mode involving void coalescence and growth with final failure occurring by knife edge rupture of numerous microligaments between voids. Two major types of acoustic emission were detected. The first occurred prior to yielding and was attributed to dislocation glide over distances above some critical minimum detectable mean free path. GRA

N84-17627# Johns Hopkins Univ., Baltimore, Md. Dept. of Materials Science and Engineering.

ACOUSTIC EMISSION DETERMINATION OF DEFORMATION MECHANISMS LEADING TO FAILURE OF NAVAL ALLOYS, VOLUME 2 Final Report, 27 Dec. 1979 - 27 Dec. 1982

J. T. Glass, S. Majerowicz, and R. E. Green, Jr. May 1983 258 p 2 Vol.

(Contract N00024-80-C-5337)

(AD-A135388; DTNSRDC/SME-CR-19-83-Vol-2) Avail: NTIS HC A12/MF A01 CSCL 20/1

An experimental investigation was conducted in order to determine the degree of acoustic emission signal modification due to propagation through specimens of different geometries. Initial efforts were directed at comparison of a number of acoustic emission probes in order to determine their sensitivity and their ability to detect an unmodified reproducible theoretically predicted waveform. The results of these tests showed that an optical interferometric probe possessed the largest frequency bandwidth and a National Bureau of Standards conical piezoelectric transducer possessed the best waveform detection sensitivity. These two probes were therefore selected to make measurements of the surface displacements due to a reproducible acoustic emission source as a function of distance from the source for several different geometrically shaped objects. Long test specimens in the form of a right circular cylinder, a rectangular cross-section bar, a moderately thin-walled pipe, and an I-beam were used for these propagation measurements. GRA

N84-17628# Nebraska Univ., Lincoln. Coll. of Engineering and Technology.

ENTROPY PRODUCTION DURING FATIGUE AS A CRITERION FOR FAILURE. THE CRITICAL ENTROPY THRESHOLD: A MATHEMATICAL MODEL FOR FATIGUE Annual Report, 15 Aug. 1982 - 14 Aug. 1983

P. W. Whaley 15 Aug. 1983 106 p

(Contract N00014-82-K-0804; NR Proj. 229-046)

(AD-A134767; AR-1) Avail: NTIS HC A06/MF A01 CSCL 20/11

A mathematical model of fatigue crack nucleation is described using the irreversible thermodynamics to quantify the damage caused by plastic straining. The model is based on the hypothesis that the entropy gain which results from dynamic irreversible plastic straining is a material constant. A random model of internal friction is used to calculate the irreversible part of the hysteresis energy dissipation rate, enabling the quantification of uncertainty through the variance of the dynamic plastic strain. In this manner, the mathematical model for fatigue crack nucleation provides an estimate for longevity including confidence intervals under arbitrary temperature, environment, and loading history. The model explains the existence of an endurance limit. Although this analysis was conducted for an uncracked material leading to time estimates for crack nucleation, the theory can easily be extended to the case of crack propagation using the methods of fracture mechanics. Author (GRA)

N84-17629# Anamet Labs., Inc., San Carlos, Calif. Applied Mechanics Div.

EVALUATION OF A BIAXIAL TEST FIXTURE Interim Report, Apr. 1981 - Oct. 1982

J. A. Holst Jan. 1983 173 p

(Contract F33615-81-C-3201; AF Proj. 2401)

(AD-A134845; ANAMET-1082.1A; AFWAL-TR-82-3109) Avail: NTIS HC A08/MF A01 CSCL 11/4

This report evaluates a test system for examining laminated composite materials subjected to a biaxial state of stress. The system utilizes short, thin-walled cylindrical specimens loaded with combinations of axial compression, internal pressure and external pressure. Fourteen instrumented specimens were tested with gages of five different pattern designs and eleven different gage layouts depending on the type of load applied to the specimens. The test data is reported and the performance, validity and repeatability of the test system is evaluated in the report. It was found that the system was best suited for testing specimens with internal pressure only. The next best test results were obtained with axial load only. Combinations of internal pressure with axial load produced good results, however there was little correlation between the biaxial stress ratio and the shape of the failure envelopes. Very poor and unpredictable results were obtained from the tests using external pressure loads. These specimens failed in buckling at very low loads due to compressive hoop stresses. Author (GRA)

N84-17630# Northwestern Univ., Evanston, Ill. Structural Mechanics Lab.

PLANE STRESS CRACK-LINE FIELDS FOR CRACK GROWTH IN AN ELASTIC PERFECTLY-PLASTIC MATERIAL Interim Report

J. D. Achenbach and Z. L. Li 1 Sep. 1983 26 p Presented at the 16th ASTM Natl. Symp. on Fracture Mech.

(Contract N00014-76-C-0063)

(AD-A134868; NU-SML-TR-83-1) Avail: NTIS HC A03/MF A01 CSCL 11/9

Mode-I crack growth in an elastic perfectly-plastic material under conditions of generalized plane stress has been investigated. In the plastic loading zone, near the plane of the crack, the stresses and strains have been expanded in powers of the distance, y, to

the crack line. Substitution of the expansions in the equilibrium equations, the yield condition and the constitutive equations yields a system of simple ordinary differential equations for the coefficients of the expansions. This system is solvable if it is assumed that the cleavage stress is uniform on the crack line. By matching the relevant stress components and particle velocities to the dominant terms of appropriate elastic fields at the elastic-plastic boundary, a complete solution has been obtained for epsilon sub y in the plane of the crack. The solution depends on crack-line position and time, and applies from the propagating crack tip up to the moving elastic-plastic boundary. Numerical results are presented for the edge crack geometry. GRA

N84-17631# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
A STUDY ON THE TENSILE STRENGTH OF ICE AS A FUNCTION OF GRAIN SIZE
J. H. Currier, E. M. Schulson, and W. F. St.Lawrence May 1983 45 p
(Contract DAAG29-80-C-0004)
(AD-A134889; CRREL-83-14) Avail: NTIS HC A03/MF A01 CSCL 08/12

An analysis of ice fracture that incorporates dislocation mechanics and linear elastic fracture mechanics is discussed. The derived relationships predict a brittle to ductile transition in polycrystalline ice under tension with a Hall-Petch type dependence of brittle fracture strength on grain size. A uniaxial tensile testing technique, including specimen preparation and loading system design was developed and employed to verify the model. The tensile strength of ice in purely brittle fracture was found to vary with the square root of the reciprocal of grain size, supporting the relationship that the theory suggests. The inherent strength of the ice lattice and the Hall-Petch slope are evaluated and findings discussed in relation to previous results. Monitoring of acoustic emissions was incorporated in the tests, providing insights into the process of microfracture during ice deformation. GRA

N84-17632# UNC Nuclear Industries, Inc., Richland, Wash.
A NEW TECHNIQUE FOR MEASURING METAL SURFACE PROPERTIES AT THE RAYLEIGH CRITICAL ANGLE
R. L. Richardson 19 Oct. 1983 5 p refs Presented at the IEEE Ultrasonics Symp, Atlanta, 31 Oct. 1983
(Contract DE-AC06-76RL-01857)
(DE84-001770; UNI-SA-116; CONF-8310187-1) Avail: NTIS HC A02/MF A01

Cracks in reactor materials are enlarged through stress and thermal cycling. The early detection of microcracks, residual stress or other surface anomalies can lead to improved reactor surveillance. The development of an early detection tool is described through the frequency response of a plane water-metal interface ensonified at the Rayleigh critical angle. The character of the residual response demonstrates the frequency of zero reflection for a variety of water-metal interfaces. This technique can be used as a sensitive indicator of surface anomalies found on reactor piping or fuel elements. The technique lends itself to a rapid method for material identifications. DOE

N84-17633# Sandia Labs., Albuquerque, N. Mex.
FREQUENCY AND MODE SHAPE CALCULATIONS FOR VERTICAL AXIS WIND TURBINES USING REDUCTION TECHNIQUES AND COMPLEX EIGENSOLVERS
James R. Koteras Nov. 1983 27 p refs
(Contract DE-AC04-76DP-00789)
(DE84-003316; SAND-82-1016) Avail: NTIS HC A03/MF A01

The reliability of reduction techniques and complex eigensolvers when used to compute frequencies and mode shapes for finite element models of vertical axis windturbines was examined. Reduction schemes produce a lower order system of equations which accurately describe the dynamic characteristics of complex structures and hence reduce the cost of eigensolutions. Two reduction schemes, Gugan reduction, generalized dynamic reduction, and two Hessenberg method, were examined. Two possible combinations of reduction method and eigensolver were examined. The Guyan reduction plus the inverse power method and generalized dynamic reduction plus the upper Hessenberg method were also examined. Both combinations worked reliably for the calculation of frequencies and mode shapes of three different wind turbine models when certain basic guidelines were followed. The size of the reduced problem which can be obtained from a particular reduction scheme determines which computational approach is more efficient. DOE

N84-17634# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
TECHNICAL THEORY OF PNEUMATIC BEAMS
Hans C. Strifors 29 Aug. 1983 45 p refs In SWEDISH; ENGLISH summary
(FOA-C-20504-E4; ISSN-0347-3694) Avail: NTIS HC A03/MF A01

States of stress and deformation in pneumatic beams subjected to transversal loads are discussed. The load carrying capability of such beams is considered for loadings large enough to cause incipient buckling. The influence of shear stress and of torsional stress are studied. Calculations for a console with a local load at the free end, and an evenly distributed load are presented. Author (ESA)

N84-17635# Technische Hogeschool, Delft (Netherlands).
HERON, VOLUME 28, NO. 1, 1983. DYNAMIC ELASTO-PLASTIC MODEL FOR REINFORCED CONCRETE MEMBERS
C. vanderVeen, J. Blaauwendraad (Rijkswaterstaat, Utrecht), and J. Witteveen, ed. 1983 57 p refs Prepared in cooperation with Inst. TNO voor Bouwmaterialen en Bouwconstructies, Delft
(PB84-109057) Avail: NTIS HC A04/MF A01 CSCL 13C

The object was to ascertain whether combustible substances involving an explosion hazard should be permitted to be transported through underwater road tunnels. Attention was more particularly focused on the behavior of the tunnel roof under explosion load conditions. First, the load resisting capacity of a reinforced concrete section under impulsive load was investigated, with particular reference to the effect of shear on the failure load. Next, a generally applicable numerical beam model was developed with which a dynamic response in the plastic range can be simulated. GRA

N84-17636# Mississippi State Highway Dept., Jackson. Research and Development Div.
EVALUATION OF CHEM-CRETE HIGH STRENGTH MODIFIED ASPHALT CONCENTRATE Final Report
A. B. Crawley Sep. 1983 30 p Sponsored in part by Federal Highway Administration
(PB84-105089; MSHD-RD-83-675) Avail: NTIS HC A03/MF A01 CSCL 13C

A Chem-Crete modified sand asphalt base course was constructed and evaluated to determine its ability to significantly increase the Marshall stability of the paving material. Test and control sections were established on a low traffic volume coastal highway. The base course mixture was produced in an asphalt batch plant with only minor changes in plant operations. No problems developed during mix production, laydown or compaction. GRA

N84-17637# Bureau of Reclamation, Denver, Colo. Engineering and Research Center.
CONCRETE TENSILE STRENGTH STUDY
E. L. Ore Apr. 1983 30 p refs
(PB84-101021; REC-ERC-81-5) Avail: NTIS HC A03/MF A01 CSCL 13C

Construction of double curvature, thin arch dams prompted an acute interest in the tensile strength, both static and dynamic, of concrete. The influence on tensile strength of such variables as specimen size and shape, aggregate size and shape, cement content, and water reducing admixtures was questioned. Only tensile strength was considered. Many indirect methods, whereby tensile strength is derived rather than measured, were studied and it was apparent that the splitting test was the best substitute for the direct method. Constituents used included aggregates from

three sources graded to 19-, 37.5-, 75-, and 100-mm (3/4-, 1 1/2-, 3-, 4-in) maximum size, two cements, one fly ash, and one WRA. Two specimen sizes and configurations were used. GRA

N84-17638# National Bureau of Standards, Washington, D.C. Center for Manufacturing Engineering.
DETERMINATION OF THE VISCOELASTIC SHEAR MODULUS USING FORCED TORSIONAL VIBRATIONS Final Report, 1980 - 1982
Edward B. Magrab Sep. 1983 43 p refs Sponsored in part by Navy Ship Research and Development Center
(PB84-119700; NBSIR-83-2776) Avail: NTIS HC A04/MF A01 CSCL 20K

A forced torsional vibration system which measures the shear storage and loss moduli on right circular cylindrical specimens whose diameter can vary to 9 cm and whose length can vary from 2 to 15 cm was developed. The method and apparatus are usable over the frequency range 80 to 550 Hz and a temperature range of -20 C to 80 C. GRA

N84-17639# California Univ., Berkeley. Div. of Structural Engineering and Structural Mechanics.
NONLINEAR GEOMETRIC, MATERIAL AND TIME DEPENDENT ANALYSIS OF REINFORCED CONCRETE SHELLS WITH EDGE BEAMS Final Report
Esmond C. Chan Dec. 1982 374 p refs
(Grant NSF CME-79-18057)
(PB84-104454; UCB/SESM-82/08) Avail: NTIS HC A16/MF A01 CSCL 13C

A numerical method of analysis was developed for the analysis of 3D reinforced concrete frames, shells with or without edge beams through their elastic, inelastic and ultimate load ranges. Nonlinearities as a result of tensile cracking, nonlinear behavior of concrete in compression, yielding of the steel reinforcement, geometric nonlinearities as a result of finite displacement; and the time dependent effects of creep and shrinkage are included in the analysis. A finite element displacement formulation coupled with a time step integration solution is used. The iterative scheme is based upon double step method with the constant imposed displacement constraint. GRA

N84-17217*# Dayton Univ., Ohio. Research Inst.
THE EFFECTS OF THE SPACE ENVIRONMENT ON DAMPING MATERIALS AND DAMPING DESIGNS ON FLEXIBLE STRUCTURES
Matthew F. Kluesener *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 79-102 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 20K

42 GEOSCIENCES (GENERAL)

N84-17640# Committee on Science and Technology (U. S. House).
PROVIDING COMPREHENSIVE NATIONAL POLICY DEALING WITH NATIONAL NEEDS AND OBJECTIVES IN THE ARCTIC AND NATIONAL MATERIALS POLICY
Washington GPO 1984 44 p Rept. to accompany S. 373 presented by the Comm. on Sci. and Technol., 98th Congr., 2d Sess., 31 Jan. 1984
(H-Rept-98-593; GPO-27-838) Avail: US Capitol, House Document Room

The formulation of a coordinated national policy for Arctic research and for the coordination of Federal Arctic research programs with each other and with national policy is provided. Responsibilities for and necessary coordination of critical materials policies and the programs necessary to implement those policies are established. S.L.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N84-17641*# Agricultural Research Service, Beltsville, Md. Hydrology Lab.
COMPARISON OF THE INFORMATION CONTENT OF DATA FROM THE LANDSAT 4 THEMATIC MAPPER AND THE MULTISPECTRAL SCANNER Final Report
John C. Price [1984] 56 p Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(NASA Order S-10772-C)
(E84-10081; NASA-CR-173231; NAS 1.26:173231) Avail: NTIS HC A04/MF A01 CSCL 08B

Evaluation of information contained in data from the visible and near-IR channels of LANDSAT 4 TM and MSS for five agricultural scenes shows that the TM provides a significant advance in information gathering capability as expressed in terms of bits per pixel or bits per unit area. The six reflective channels of the TM acquire 18 bits of information per pixel out of a possible 48 bits, while the four MSS channels acquire 10 bits of information per pixel out of a possible 28 bits. Thus the TM and MSS are equally efficient in gathering information (18/48 to approximately 10/28), contrary to the expected tendency toward lower efficiency as spatial resolution is improved and spectral channels are added to an observing system. The TM thermal IR data appear to be of interest mainly for mapping water bodies, which do not change temperature during the day, for assessing surface moisture, and for monitoring thermal features associated with human activity. A.R.H.

N84-17642*# Kansas Univ., Lawrence. Remote Sensing Lab.
FOCUSING THE PARABOLIC ANTENNA
L. K. Wu, R. K. Moore, and F. T. Ulaby Sep. 1983 43 p refs
(Grant NAG5-271)
(NASA-CR-173304; NAS 1.26:173304; RSL-TM-587-1) Avail: NTIS HC A03/MF A01 CSCL 20N

The focused parabolic antenna has far field pattern characteristics in the radiating near field region. Therefore, it can provide fine resolutions in the across range dimensions. The technique of focusing the parabolic antenna is discussed and applied to a 2-1/2 foot parabolic antenna at X-band. The results of the pattern measurements at various ranges from 2.8 m to 5 m are provided. S.L.

N84-17643# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
REPORTS ON CARTOGRAPHY AND GEODESY, SERIES 1: ORIGINAL REPORTS, NUMBER 90 [NACHRICHTEN AUS DEM KARTEN- UND VERMESSUNGSWESEN. REIHE 1: ORIGINALBEITRAEGE, HEFT NR. 90]
1982 76 p refs In GERMAN; ENGLISH summary
(ISSN-0469-4236) Avail: NTIS HC A05/MF A01

Very long baseline interferometry is presented. Two methods of Doppler data reduction, the semi short arc and the short arc technique, are discussed. The results of permanent Doppler measurements at a satellite observation station are presented. Calibration measurements of Doppler receivers are summarized. Simultaneous Doppler measurements at four stations are described. A mobile laser ranging system is introduced. For individual titles, see N84-17644 through N84-17649.

N84-17644# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
THE IMPORTANCE OF RADIO INTERFEROMETRY FOR GEODYNAMICS [DIE BEDEUTUNG DER RADIOINTERFEROMETRIE FUER DIE GEODYNAMIK]
James Campbell, Klemen Nottarp, and Richard Kilger *In its* Rept. on Cartography and Geodesy, Ser. 1: Original Repts., No. 90

1982 p 5-8 refs In GERMAN; ENGLISH summary Presented at DFG-Journalisten-Information-stage SFB 78, St. Englmar, Apr. 1981 (For primary document see N84-17643 08-43)
Avail: NTIS HC A05/MF A01

The use of Very Long Baseline Interferometry (VLBI) as a geodetic and astrometric measuring procedure for geodynamics is summarized. This procedure registers horizontal and vertical crustal motion with high precision. The antennas are connected by cables, and very precise frequency standards provide the necessary phase stability. Radio signals from several sources are recorded on magnetic tapes together with time marks, and are evaluated on a correlator after measurement. Longitude and direction of the baseline are obtained with an accuracy of + or - 4 cm. Rotation phase of the Earth and the source positions in astronomical coordinates are deduced. Radio interferometric measurements are also performed with mobile VLBI-stations. Author (ESA)

N84-17645# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
INVESTIGATIONS OF DOPPLER POSITION DETERMINATION FOLLOWING THE SHORT ARC AND SEMI SHORT ARC TECHNIQUES [UNTERSUCHUNGEN ZUR DOPPLERPOSITIONSBESTIMMUNG NACH DER SEMI-SHORT-ARC- UND DER SHORT-ARC-METHODE] **c48**
Hermann Hauck, Dieter Leigemann, and Wolfgang Schlueter *In its* Rept. on Cartography and Geodaesie, Ser. 1: Original Repts., No. 90 1982 p 9-27 refs In GERMAN; ENGLISH summary (For primary document see N84-17643 08-43)
Avail: NTIS HC A05/MF A01

Two methods of Doppler data reduction are discussed, the semi short arc technique used in the program GEODOP and the short arc technique used in ORBDOP. Identical data sets of two Doppler campaigns (NORSDOC and SEATOC) are reduced using both programs, and the results are compared. Up to an area of 1000 x 1000 km square, no significant difference in the relative accuracy of the station coordinates is found. For larger networks the short arc results have a 10% to 30% higher accuracy than the semi short arc solution, but the computation costs are up to 5 times higher. Author (ESA)

N84-17646# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
RESULTS OF PERMANENT DOPPLER MEASUREMENTS AT THE SATELLITE OBSERVATION STATION WETTZELL [ERGEBNISSE PERMANENTER DOPPLERMESSUNGEN AUF DER SATELLITENBEOBACHTUNGSSTATION WETTZELL]
W. Schlueter, G. Blenski, K. Herzberger, W. Mueller, and R. Stoeger *In its* Rept. on Cartography and Geodesy, Ser. 1: Original Repts., No. 90 1982 p 29-43. refs In GERMAN; ENGLISH summary (For primary document see N84-17643 08-43)
Avail: NTIS HC A05/MF A01

The results of permanent Doppler measurements carried out at the satellite observation station Wettzell since 1975 are discussed. The data reduction was performed using the broadcast and the precise ephemeris in successive 5 day observation periods. The maximum deviation from the mean satellite coordinates are of the order of 1 m using the precise ephemeris, and of the order of 3 m using the broadcast ephemeris. Systematic periodical behavior occurs with a 4 month period. Author (ESA)

N84-17647# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
CALIBRATION MEASUREMENTS OF DOPPLER RECEIVERS [KALIBRIERUNGSMESSUNGEN VON DOPPLEREMPFANGSANLAGEN]
Wolfgang Schlueter and Franz-Josef Lohmar *In its* Rept. on Cartography and Geodesy, Ser. 1: Original Repts., No. 90 1982 p 45-58 refs In GERMAN; ENGLISH summary (For primary document see N84-17643 08-43)
Avail: NTIS HC A05/MF A01

Results of calibrating Doppler measurements are summarized. Simultaneous Doppler observations at one site using different equipment under the same conditions allows the determination of systematic deviations between the receivers. Deviations in the height component of up to 1 m are detected between the adopted phase center given by the manufacturers and the resulting values. As the accuracy of simultaneous point positioning is between 0.3 and 0.5 m, corrections which are determined by such calibration procedures must be taken into account. Author (ESA)

N84-17648# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
RESULTS OF THE SIMULTANEOUS DOPPLER MEASURING CAMPAIGN HOTDOC FROM 29 SEPTEMBER TO 10 OCTOBER 1979 [ERGEBNISSE DER SIMULTAN-DOPPLERMESSKAMPAGNE HOTDOC VOM 29.09. BIS 10.10. 1979]
Wolfgang Schlueter and Franz Kraemer *In its* Rept. on Cartography and Geodesy, Ser. 1: Original Repts., No. 90 1982 p 59-64 refs In GERMAN; ENGLISH summary (For primary document see N84-17643 08-43)
Avail: NTIS HC A05/MF A01

Simultaneous Doppler observations were carried out at the stations Wettzell (Germany) Hohenpeissenberg (Germany), Schafberg (Austria), and Graz (Austria). Systematic deviations for the satellite coordinates are found to be $>$ 3 m in cases using the broadcast ephemeris system, and 1 m using the precise ephemeris. Random deviations are between 1 and 2 m, and between 0.3 and 0.6 m respectively. A comparison of the derived coordinates with the coordinates evaluated from the German-Austrian Doppler Observation Campaign is also tabulated. Author (ESA)

N84-17649# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
THE MOBILE LASER RANGING SYSTEM AND ITS PLANNED USE IN THE FRAMEWORK OF INTERNATIONAL RESEARCH ON GEODYNAMICS [DAS MOBILE LASERENTFERNUNGSMESSSYSTEM DES SFB 78 UND SEIN GEPLANTER EINSATZ IM RAHMEN DER INTERNATIONALEN ARBEITEN ZUR GEODYNAMIK]
Peter Wilson *In its* Rept. on Cartography and Geodesy, Ser. 1: Original Repts., No. 90 1982 p 65-75 refs In GERMAN; ENGLISH summary (For primary document see N84-17643 08-43)
Avail: NTIS HC A05/MF A01

A truck-mounted laser ranging system is described. Accuracy is high enough to compare measurements with geophysical and geological kinematic models. The system consists of a mounting with a 40 cm diameter telescope opening, and externally connected laser and detection units with microprocessor control. Operation in the NASA Crustal Dynamics Program is discussed.
Author (ESA)

N84-17650# European Space Agency, Paris (France).
REMOTE SENSING: NEW SATELLITE SYSTEMS AND POTENTIAL APPLICATIONS
W R Burke, comp. Sep. 1983 688 p refs Proc. of ASSA Summer School Sem., Alpbach, Austria, 27 Jul.- 5 Aug. 1983 sponsored by ESA, CNES, DFVLR and NWNF
(ESA-SP-205; ISSN-0379-6566) Avail: NTIS HC A09/MF A01

The SPOT, ERS-1 (ESA satellite), Spacelab, and LANDSAT remote sensing programs were discussed. Land use, thematic mapping, geological, environmental monitoring, and coastal zone applications were considered. Active and passive sensors were considered. For individual titles, see N84-17651 through N84-17669.

N84-17651*# National Aeronautics and Space Administration, Washington, D. C. Office of Space Science and Applications.
CURRENT TRENDS AND RESEARCH CHALLENGES IN LAND REMOTE SENSING
Mark Settle *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 3-10 (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The use of space technology to conduct repetitive global surveys of terrestrial surface conditions is reviewed. The state-of-

the-art is determined by the measurement capabilities of orbital sensor systems, the maneuvering and data transmission capabilities of orbital platforms, and the sophistication of the user community. Introduction of the Landsat Thematic Mapper and SPOT sensor systems and operational use of the Space Shuttle are discussed. Research challenges of the 1980's are related to the removal of atmospheric and topographic effects in remotely sensed imagery, the extraction of information from high dimensionality data sets, and the ability to conduct meaningful ground truth surveys to support the analysis and interpretation of remotely sensed data. Author (ESA)

N84-17652# Centre National d'Etudes Spatiales, Toulouse (France). SPOT IMAGE.
SPOT (FRENCH SATELLITE)
J. C. Rivereau *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 11-17 (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The SPOT remote sensing satellite and its data distribution program are described. The spacecraft carries two identical static solid state arrays of detectors (CCD) operating in the visible and near infrared. Ground resolution is 10 m in the panchromatic mode, 20 m in the multispectral mode. Two ground receiving stations and preprocessing centers, receiving direct data over the polar zone, Europe and North Africa as well as worldwide data recorded on the two satellite tape recorders, are supported by a network of regional receiving stations located around the world. A central data bank unit and a worldwide distribution network ensure permanent information regarding data availability; and flexible on request data acquisition. Author (ESA)

N84-17653# Centre National d'Etudes Spatiales, Toulouse (France). SPOT IMAGE.
TYPICAL SPOT DATA AND PRODUCTS: POTENTIAL APPLICATIONS
J. C. Rivereau *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 19-23 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The simulation studies of SPOT satellite for land use, agricultural, and coastal studies data acquisition are summarized. These suggest that SPOT images can replace medium and large scale aerial photographs in thematic applications. The high resolution is well suited to the field and plot sizes most frequently encountered in Europe. The flexibility of satellite programming makes it possible to acquire the repated information essential for crop identification. In town planning, the simulation studies suggest that 10 m resolution permits the identification of most urban features important in the planning process. In coastal studies, it is possible to monitor dynamic phenomena, to investigate foreshore areas and to identify various types of aquatic vegetation. In topographic cartography SPOT imagery is adequate for producing 1:100,000 maps and updating at larger map scales. Stereopairs provide 3D vision in geology and topographic mapping, where altitude and morphology perception is important. Author (ESA)

N84-17654# European Space Agency, Paris (France).
THE FIRST EUROPEAN REMOTE SENSING SATELLITE (ERS-1): OVERALL DESCRIPTION, POTENTIAL APPLICATIONS AND USERS
G. Duchossois *In its* Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 25-36 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The ERS-1 satellite and its scientific objectives are described. A C-band scatterometer measures wind speed and direction; a Ku-band radar altimeter measures significant wave height and wind speed at nadir and provides measurements over ice and major ocean currents; a C-band SAR takes all-weather high resolution images over polar caps, coastal zones and land areas, (also operated in a sampled mode with a reduced power level over oceans as a wave scatterometer). Laser retroreflectors are used for satellite tracking and radar altimeter calibration. An along track scanning radiometer completed with a two-frequency microwave nadir sounder measures sea surface temperature and provides information for the wet atmosphere correction for the radar altimeter. A precise range and range rate experiment provides high accuracy tracking information in support of radar altimetry for ocean circulation studies. Author (ESA)

N84-17655# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Research Dept. for Communications Technology and Remote Sensing.
REMOTE SENSING EXPERIMENTS ON SPACELAB AND STS
Franz Schlude *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 37-46 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The Shuttle Imaging Radar (SIR-A), Ocean Color Experiment (OCE), Modular Optoelectronic Multispectral Scanner (MOMS), Metric Camera (MC), and Microwave Remote Sensing Experiment (MRSE) are described. The SIR-A collected 10 million sq km of Earth surface data. The OCE measured water color to enable ocean analysis in terms of water composition and dynamics. The MOMS was used for thematic mapping, sea and vegetation monitoring, and coastal zone evaluation. The MC gives 20 to 30 m ground resolution photographs in standard aerial photography format. The MRSE comprises X-band radar operating as a dual frequency scatterometer, a SAR imaging radar, and as a passive microwave radiometer. Author (ESA)

N84-17656# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany).
TYPICAL REMOTE SENSING DATA PRODUCTS
W. Markwitz and R. Winter *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 47-51 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The West German Remote Sensing Data Center (DFD) is described. The DFD is a technical as well as a scientific service and extends from data acquisition through preprocessing, image processing, analysis and interpretation. Users are mainly German scientists, governmental administration and industry. It operates on a cost basis in national, bilateral and international activities. Applications on sea, land and in the atmosphere are discussed and examples of remote sensing data products from standard photoproducts to digital processed image data are shown. Data sources include LANDSAT MSS, LANDSAT TM, HCMM, NIMBUS 7 CZCS, Seasat SAR, Convair 580 SAR, Meteosat, NOAA 7, aircraft MSS, and Aircraft Metric Camera. Thematic maps for land use, environmental monitoring, renewable and nonrenewable resources are produced, and the carrying capacity and vegetation change in arid and semiarid areas are investigated. Author (ESA)

N84-17657# Technische Univ. Munich, Garching (West Germany). Inst. Fuer Allgemeine und Angewandte Geodaesie.
REQUIREMENTS FOR SPACEBORNE REMOTE SENSING IN GEOLOGY
J. Bodechtel *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 53-57 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

Requirements for Earth resources monitoring based on Landsat MSS data are defined. No monitoring is required, but large areal coverage and a multisensor approach are indispensable. Data acquisition under differing seasonal, meteorological and climatological conditions, and multitemporal and repeating coverage are required to trace subsurface geology dependent indicators, such as vegetation stress. Direct identification or classification of lithological, petrographic or mineralization units; of structural phenomena and of geological units using tracers or indicators such as vegetation and soil moisture are necessary. An optical sensor system requires 4 spectral bands ranging from 0.5 to 2.3 microns, with 7 bit radiometric resolution, and 20 to 30m ground pixel size in the visible spectrum, 120 to 150m in IR. Author (ESA)

N84-17658# European Space Agency, Paris (France).
LAND USE INVENTORY AND STATISTICAL SAMPLING IN AGRICULTURE
J. Meyer-Roux (Service Central des Enquetes et Etudes Statistiques, St. Mande, France) *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 59-66 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The need to adapt satellite land use data and traditional data acquisition techniques to each other is discussed. Agricultural statistics sampling techniques based on large administrative areas, farms, and frame sampling are described. It is argued that spaceborne techniques combined with regression analysis can provide optimal area frames. Author (ESA)

N84-17659# Freiburg Univ. (West Germany). Abt. Luftbildmessung und Fernerkundung.
REMOTE SENSING FROM SPACE FOR FORESTRY PURPOSES
G. Hildebrandt *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 67-74 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

Spaceborne detection of forest fires, and forest cover mapping are discussed. Using LANDSAT data it is possible to classify either by visual intepretation or by computer assisted digital methods closed forest as one among other main land use classes with 90% to 95% accuracy. Within closed forests, clear cuttings and areas of planned or destructive deforestation can be detected. Forest types are distinguished with 80% accuracy.
Author (ESA)

N84-17660# Innsbruck Univ. (Austria). Inst. fuer Meteorologie und Geophysik.
SNOW AND ICE MONITORING BY MICROWAVE TECHNIQUES
H. Rott *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 75-86 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

Methods and applications of microwave sensors for snow and land ice monitoring are presented. Visible and infrared satellite sensors, and microwave radiometry and radar methods are discussed. Physical properties of different snow types are described. Examples of surface, aircraft, and satellite measurements are given for emission and backscattering from dry snow, wet snow, and polar firn. Analyses of SAR-580 data of an Alpine test site, glaciological studies with SEASAT SAR and altimeter, and methods for global snow mapping with Nimbus-7 SMMR are presented. The results are very promising for operational applications in hydrology and glaciology. Author (ESA)

N84-17661# Centre Oceanologique de Bretagne, Brest (France).
COASTAL ZONES INVENTORY BY HIGH RESOLUTION SATELLITES
L. Loubersac *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 87-94 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The use of satellite remote sensing data for coastal inventories (baselines) and monitoring (if high spatial and temporal resolutions are yield compatible); sensors; and constraints linked to the different resolutions are exposed. High resolution data are very sensitive to luminance variations from pixel to pixel and to association of pixels. The pixel must not be considered alone with its own radiometric counts but considered with respect to its environment. Texture analysis is expected to benefit from higher resolution. Facies discrimination, facies structural analysis, and geomorphological investigations should benefit from mixing data from various sources, e.g., passive radiometric data with active sources such as SAR. Author (ESA)

N84-17662# Direction de la Prevention des Pollutions, Neuilly (France). Direction de la Prevention des Pollutions.
THE REMOTE SENSING OF OIL POLLUTION AT SEA: AN ATTEMPT AT SYNTHESIS
J. M. Massin *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 95-100 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

A pilot study of international requirements concerning the detection, tracking and monitoring of oil spills, to identify the present capabilities of existing remote sensing systems and to define lines of research where the development of new remote sensing systems could be fruitful is summarized. It is concluded that only a combination of several sensors (integrated system) could theoretically meet all the requirements. Data should be available in real time, with data processing software considered as an integral part of the sensor. Author (ESA)

N84-17663# Dundee Univ. (Scotland). Carnegie Lab. of Physics.
APPLICATIONS FOR FISHERIES
Arthur P. Cracknell *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 101-114 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The use of remote sensing to provide information on weather, sea state (including data on sea ice) and the location of shoals of fish, is discussed and an experimental program for fishery operations is described. Problems associated with satellite remote sensing data for fisheries include availability of data; extraction of required information; atmospheric effects on signals from the surface of the sea; relationships between marine physical and biological parameters and the migratory habits of fish; processing and interpretation of the data, within the timescale necessary; and the dissemination of the results. The satellite experiment provided ships with information on sea surface temperatures, mixed layer depth, winds and wind derivatives, wave heights and directions, and ocean color zones and boundaries. Author (ESA)

N84-17664# Bergen Univ. (Norway). Norwegian Maritime Remote Sensing Program (NORMARSEN).
REMOTE SENSING OF SEA ICE
Einar Svendsen *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 115-127 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

An algorithm for estimating total and multiyear sea ice concentration from passive microwave and surface air temperature measurements was developed, using 5 to 100 GHz emissivity spectra. Comparison between Nimbus 7 SMMR and aircraft microwave measurements indicates that estimates of total ice concentration are accurate to + or - 3% and those of multiyear ice concentration to + or - 10%. These accuracies are not valid during the melt season when the snow on the ice is wet. The SMMR locates the sea ice edge accurately to within 10 km and the ability of the SMMR to follow moving patches of multiyear ice is demonstrated. The need for accurate concentration estimates for reliable heat budget estimates in the Arctic is discussed. Mesoscale features along the ice edge are revealed by a 1.215 GHz SAR. Author (ESA)

N84-17665# Det Norske Veritas, Hovik. Section of Environmental Loads.
SEA STATE MONITORING AND APPLICATIONS
Anton G. Kjelaas *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 129-133 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

Imaging radar, altimeter, and scatterometer techniques for sea surface monitoring are discussed. Remote sensing and in situ techniques are compared, but it is not possible to say whether discrepencies are due to satellite or in situ measurement errors. Satellite data contributions to ocean circulation models, wave models, numerical weather forecasting, mesoscale eddy studies, and storm surge investigations are listed. Commercial applications in the offshore oil and gas industry, fisheries, mining, environmen-

tal monitoring, and marine transportation are summarized. Seasat and GEOS-3 data demonstrate that significant wave height, wave direction and surface wind vector can be measured from space. Development of satellite oceanography depends on improved algorithms for deriving the geophysical parameters of interest, and real time data processing and dissemination for commercial users. Author (ESA)

N84-17666# Centre National d'Etudes Spatiales, Toulouse (France).
REMOTE SENSING FOR AGRICULTURE AND LAND USE
A. Podaire *In* ESA Remote Sensing: New Satellite Systems and potential Appl. Sep. 1983 p 137-139 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

Simulated bands of SPOT and LANDSAT 4 data, based on vegetation and soil signatures, were analyzed. Visual interpretation of color composites (color infrared type) shows important correlations between visible channels. By computing these correlations on a 7 km sq region, correlation coefficients close to 0.95 between SPOT and LANDSAT data are obtained. The vegetation index was used to eliminate simultaneous changes of solar illumination (direct flux) in IR and visible spectral bands, due to structural heterogeneities in the landscape (slopes), and, with the same (direct) solar illumination, simultaneous variations of the reflectance factor. The index gives information on the growth cycle of winter and spring crops. Author (ESA)

N84-17667# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Research Dept. for Communications Technology and Remote Sensing.
WORKSHOP ON ACTIVE MICROWAVE SENSOR DESIGN
Franz Schlude *In* ESA Remote Sensing: New satellite Systems and Potential Appl. Sep. 1983 p 143-150 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The design of a synthetic aperture radar for land observation and of a scatterometer for measuring global wind speed and wind direction are described. The fundamental equations governing radar operation are recalled. The thin point radar target model and the quasi continuous point target distribution are outlined. The wind scatterometer measuring principle, beam configuration, and the accuracy of measurements of sea surface radar backscattering are discussed. Author (ESA)

N84-17668# Technische Univ. Munich, Garching (West Germany). Inst. fuer Allgemeine und Angewandte Geodaesie.
REMOTE SENSING FOR GEOLOGY
H. Kaufmann and F. Jaskolla *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 151-157 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

Landsat digital image processing techniques used in geology are described. By using a color coding concept, which describes a color in terms of its intensity, hue, and saturation (IHS), it is possible to combine Heat Capacity Mapping Mission (HCMM) day and night thermal IR recordings with LANDSAT. This could be achieved by treating the high resolution LANDSAT image as intensity, the HCMM night IR image as hue and the corresponding day IR as saturation. Another approach merges different data sets via a quasi topography, generated through a synthetic stereo effect. The algorithm is based on a simple geometrical relationship, described by the parallax formula. The already known heights are given by the pixel values of the HCMM day IR: the higher the day time temperature the greater the offset of the corresponding pixels and therefore the higher the topography. Topography can be seen as a function of emissivity rate and used for mapping temperature variations. Author (ESA)

N84-17669# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Hochfrequenztechnik.
APPROACHES TO RADAR IMAGE INTERPRETATION
Alois J. Sieber *In* ESA Remote Sensing: New Satellite Systems and Potential Appl. Sep. 1983 p 159-166 refs (For primary document see N84-17650 08-43)
Avail: NTIS HC A09/MF A01

The electromagnetic interaction mechanism of a radar beam with its target, described by the backscattering coefficient, is outlined. Image data correction by polynomial interpolation and moving average procedures is recalled. Global image analysis, speckle characteristics, and the relation between wavelength and target length in thematic interpretation are discussed. Speckle reduction by incoherent averaging and adaptive filtering is treated. Author (ESA)

N84-17670# Maryland Univ., College Park. Computer Vision Lab.
APPLICATION OF HIERARCHICAL DATA STRUCTURES TO GEOGRAPHICAL INFORMATION SYSTEMS Contract Report, 29 Jul. 1982 - 29 Jun. 1983
Hanan Samet and Azriel Rosenfeld Fort Belvoir, Va. Army Engineer Topographic Labs. 30 Sep. 1983 84 p
(Contract DAAK70-81-C-0059)
(AD-A134999; TR-1327; ETL-0337) Avail: NTIS HC A05/MF A01 CSCL 08/2

The purposes of this investigation were twofold: (1) to construct a geographic information system based on the quadtree hierarchical data structure, and (2) to gather statistics to allow the evaluation of the usefulness of this approach to geographic information system organization. To accomplish the above objectives, in Phase I of the project a database was built that contained three maps supplied under the terms of the contract. These maps described the flood plain, elevation contours, and language classes of a region in California. The map regions were represented in quadtree form, and algorithms were developed for basic operations on quadtree-represented regions (set-theoretic operations, point-in-region determination, region property computation, and submap generation). The efficiency of these algorithms was studied theoretically and experimentally. On Phase II of the project, the following additional tasks were performed: (a) Query Language Design; (b) Database updating; (c) Point and linear feature data construction. GRA

N84-17671# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
TRANSPORT OF WATER IN FROZEN SOIL. I: EXPERIMENTAL DETERMINATION OF SOIL-WATER DIFFUSIVITY UNDER ISOTHERMAL CONDITIONS
Y. Nakano, A. R. Tice, J. L. Oliphant, and T. F. Jenkins Aug. 1983 14 p
(DA Proj. 4A1-61101-A-91-D)
(AD-A135419; CRREL-83-22) Avail: NTIS HC A02/MF A01 CSCL 08/13

A new experimental method for measuring the soil-water diffusivity of frozen soil under isothermal conditions is introduced. The theoretical justification of the method is presented and the feasibility of the method is demonstrated by experiments conducted using marine-deposited clay. The measured values of the soil-water diffusivity are found comparable to reported experimental data. Author (GRA)

N84-17672# Army Engineer Topographic Labs., Fort Belvoir, Va.
EVALUATION OF PUBLISHED CRITERIA FOR IDENTIFYING METAMORPHIC ROCKS ON AIR PHOTOS: TWO CASE STUDIES IN THE NORTHEASTERN UNITED STATES
J. Ehlen May 1983 127 p
(AF Proj. 4A1-61102-B-52-C)
(AD-A135451; ETL-0326) Avail: NTIS HC A07/MF A01 CSCL 08/7

Published criteria for identifying metamorphic rocks by air photo patterns were systematically tested on regionally metamorphosed rocks in west-central Vermont and near West Point, New York, and were found inadequate for use a predictive tools. Mapping units were discriminated on the air photos by evaluating the pattern elements of landform, drainage-plan, drainage-cross section, photo

tone, and photo texture. They were identified by comparing each pattern element to its counterpart for each rock type in the published criteria. The most common pattern element rock name was selected as the name for the mapping unit. To avoid bias, geological data were not obtained until after the identification process was completed. The predicted rocks names were then compared to geologic maps and field data to determine their accuracy. Only 20 of the 74 verifiable predictions were correct. Probable causes for these results are (1) that the published criteria are incomplete and internally inconsistent and do not include all the rocks types found in the study areas; (2) that climatic and structural, or tectonic, factors, apparently not considered in the published criteria, play a significant role in determining rock type photo pattern; and (3) that the glacial history of these areas has affected the characteristic photo patterns of the rocks encountered. Moderate success was achieved, however, where lithologic diversity and morphic rocks of higher grade and/or sedimentary origin. Similar techniques have proven successful for identifying igneous and sedimentary rocks on air photos, so development of more accurate criteria for metamorphic rocks, taking these factors into consideration, is continuing. GRA

N84-17673# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
MICROWAVE DIELECTRIC CONSTANT DEPENDENCE ON SOIL TENSION Final Report, 12 Aug. 1981 - 11 Aug. 1983
F. T. Ulaby Oct. 1983 14 p
(Contract DAAG29-81-K-0142)
(AD-A134651; TR-545-5; ARO-17808.4-GS) Avail: NTIS HC A02/MF A01 CSCL 08/13

The purpose of this research is to determine the microwave dielectric behavior of soil through: (a) experimental measurements and (b) the development of theoretical models. To this end, dielectric measurements were made using waveguide and freespace transmission systems over the 1 to 2 GHz and the 4 to 18 GHz bands over a wide range of moisture for several soil types. The measured data were then used to (a) test existing theoretical models, (b) develop a new physical soil model, and (c) develop semi-empirical models. Author (GRA)

N84-17674# Aberdeen Univ. (Scotland). Dept. of Geography.
NORTHEAST SCOTLAND COASTAL FIELD GUIDE AND GEOGRAPHICAL ESSAYS
W. Ritchie, ed. Jul. 1983 270 p Original contains color illustrations
(Contract DAJA45-83-M-0210)
(AD-A134861) Avail: NTIS HC A12/MF A01 CSCL 08/6

The coastline of northeast Scotland in plan is determined by faults running close inshore to both North Sea and Moray Firth coasts. Along the northern margin, an east-west trending system of faults can be identified by steep gravity gradients north of Fraserburgh. This line also coincides with the orientation of a prominent bathymetric deep. Off the east coast geological work has confirmed that relatively recent geological strate of Permo-Friassic age lie close inshore. For both north and east coasts, the detail of the coastal plan, within which the soft coastal elements have accumulated, is governed by the varying lithologies of the solid geology along the land margin. S.L.

N84-17675# Army Engineer Topographic Labs., Fort Belvoir, Va.
THE CLASSIFICATIONS OF METAMORPHIC ROCKS AND THEIR APPLICATIONS TO AIR PHOTO INTERPRETATION PROCEDURES
J. Ehlen Sep. 1983 47 p
(DA Proj. 4A1-61102-B-52-C)
(AD-A134965; ETL-0341) Avail: NTIS HC A03/MF A01 CSCL 08/7

Although there are stated Army needs for rock-type information, there are as yet few reliable procedures for obtaining much of this information, particularly for metamorphic rocks, via remote sensing. The three common classifications of metamorphic rocks, i.e., textural, facies, and formational, were evaluated in terms of their usefulness in predicting metamorphic rock types using air photo interpretation procedures. Areas in the northeastern United States containing a wide range of metamorphic rocks were selected as test areas. Predictions of rock type were verified by field reconnaissance and comparison to geologic maps. Although none of the three classifications were found adequate for use on air photos, the results of this study indicate that the potential for successfully predicting metamorphic rock types by air photo interpretation procedures exists. The textural classification was found most useful, primarily because criteria for identifying metamorphic rocks on air photos using this classification were developed previously. Although using the facies classification has potential, it is unlikely that it can be used routinely in conjunction with air photo interpretation procedures because of the high degree of skill required to identify metamorphic facies. The formational classification was found to be useful because it identifies metamorphic rocks by mapping unit, but it does not provide a mechanism for naming the rock units. GRA

N84-17676# Autometric Corp., Inc., Falls Church, Va.
APPS-4 (ANALYTICAL PHOTOGRAMMETRIC PROCESSING SYSTEM-4) REMOTE SENSING APPLICATIONS GUIDE
J. D. Peroutky Fort Belvoir, Va. Army Engineer Topographic Labs. Jun. 1983 86 p
(Contract DAAK70-81-C-0261)
(AD-A134977; Rept-901-0081; ETL-0333) Avail: NTIS HC A05/MF A01 CSCL 14/2

This report describes the Computer-Assisted Photo Interpretation Research (CAPIR) facility at the U.S. Army Engineer Topographic Laboratories (USAETL) and discusses its use, primarily with the APPS-IV analytical stereoplotter, for various remote sensings applications. The components of the APPS-IV and the geographic information system (AUTOGIS) are described, followed by discussions of the capabilities and advantages of a CAPIR-type system. A general workflow is also included as a guide to the undertaking of this type project. GRA

N84-17677# Oak Ridge National Lab., Tenn. Energy Div.
CONDUCTIVITY MAPPING OF UNDERGROUND FLOW CHANNELS AND MOISTURE ANOMALIES IN CARBONATE TERRAIN USING ELECTROMAGNETIC METHODS
F. G. Pin and R. H. Ketelle Nov. 1983 22 p refs
(Contract W-7405-eng-26)
(DE84-004098; ORNL/TM-8866) Avail: NTIS HC A02/MF A01

Electromagnetic methods were used to measure apparent terrain conductivity in the downstream portion of a watershed in which a waste disposal site is proposed. At that site, the pathways for waste migration in groundwater are controlled by subsurface channels. The identification and mapping of these subsurfaces chanels are important for the site characterization study. The channels are identified using isocurves of measured apparent conductivity. Two upstream channel branches merge into a single downstream channel which constitutes the main drainage path out of the watershed. It is found that electromagnetic terrain conductivity measurement methods are inexpensive, rapid and efficient tools for subsurface investigations. Their contribution to site characterization studies and pathways analyses is significant in planning of the monitoring program, the hydrogeological testing, and the modeling study. DOE

N84-17678# Oak Ridge National Lab., Tenn. Computer Sciences Div.
ESTIMATION OF SMALL AREA POPULATONS USING REMOTE SENSING AND OTHER APPROACHES
Robert B. Honea, B. L. Shumpert, R. G. Edwards, S. M. Margle, P. R. Coleman, J. L. Smyre, R. M. Rush, and R. C. Durfee 1983 31 p refs Presented at the Energy Resource Management, San Francisco, 22-26 Aug. 1983
(Contract W-7405-eng-26)
(DE84-003404; CONF-830847-6) Avail: NTIS HC A03/MF A01

This paper documents the results of an assessment of a variety of techniques for estimating residential population for a five-mile radial grid around a nuclear power plant located near Philadelphia, PA. Techniques evaluated ranged from the use of air photos to

infer population from housing distributions to the use of LANDSAT data to characterize probable residential population around the plant site. Although the techniques involving the use of LANDSAT data provided good results, a simple proportional area allocation method and the current procedure used by Oak Ridge National Laboratory for the Nuclear Regulatory Commission were among the best techniques. Further research using other sites and better resolution satellite data is recommended to investigate the possible refinement of population estimates using remote sensing media. DOE

N84-17679# Argonne National Lab., Ill. Energy and Environmental Systems Div.

EMPIRICAL ANALYSIS OF MEANDERING AND FLOW CHARACTERISTICS IN LABORATORY AND NATURAL CHANNELS

Dorland E. Edgar and A. Ramachandra Rao (Purdue Univ.) 1983 12 p refs Presented at the Rivers Symp., New Orleans, 24 Oct. 1983

(Contract W-31-109-eng-38)

(DE84-003461; CONF-8310199-3) Avail: NTIS HC A02/MF A01

A promising hypothesis relating meander geometry to basic flow hydraulics was presented by Anderson in 1967. Although he sucessfully applied his theory to a data set from 27 laboratory channels, a general verification of his proposed relationships has not been reported. Consequently, the applicability of his results to a larger set of both laboratory and field data was investigated. Regression analysis of data from 161 laboratory and natural meandering alluvial channels indicates that the fundamental relatonship proposed by Anderson between the relative meander length (lambda/(INTEGRAL)A) and Froude number is valid for the laboratory channels considered in this study. However, analysis of field data indicates very poor correlation between these variables. These deviations are discussed, and it is suggested that stream discharge, properties of the sediment found in the channel perimeter, and channel or valley slope are additional factors that influence meandering in natural alluvial channels. DOE

N84-17680# Marine Biological Lab., Woods Hole, Mass. Ecosystems Center.

TEST OF THE USE OF LANDSAT IMAGERY TO DETECT CHANGES IN THE AREA OF FOREST IN THE TROPICS

G. M. Woodwell, J. E. Hobbie, R. A. Houghton, J. M. Melillo, and T. A. Stone Sep. 1983 39 p refs

(Contract DE-AC02-80EV-10468)

(DE84-004444; DOE/EV-10468/T1) Avail: NTIS HC A03/MF A01

Rates of change in the area of tropical moist forest in the Brazilian state of Rondonia in the southwestern Amazon Basin were measured over several years using LANDSAT data. The purpose was to test in the tropics a technique of change detection developed in temperate forests. The entire procedure was tested from the availability of imagery on computer tapes through the details of the analysis. Three LANDSAT scenes were used to detect and measure change: June 1976, August 1978 and May 1981. Results showed within the area of one LANDSAT scene (34,000 km(2)) rates of deforestation of 26,900 ha/y from 1976 to 1978 and 55,200 ha/y from 1978 to 1981. The LANDSAT data were used with 1981 data from NOAA7 satellite to show in a preliminary estimate that 12,650 km(2) of forest was cleared in Rondonia prior to 1981. A survey of LANDSAT data available from tropical regions around the world showed that there is ample data for a LANDSAT-based evaluation of deforestation for the period 1972 to 1982 for Amazonia, Central Africa and mainland Southeast Asia. The evaluation of deforestation in insular Southeast Asia would be more difficult by LANDSAT currently due to high cloud cover in the region. DOE

N84-17681# Bayerische Akademie der Wissenschaften, Frankfurt am Main (West Germany).

VALIDATION OF SEASAT-1 ALTIMETRY USING GROUND TRUTH IN THE NORTH SEA REGION

Juergen Brennecke, ed., Dieter Leigemann, ed., Wolfgang Torge, ed., and Hans-Georg Wenzel, ed. Inst. fuer Angewandte Geodaesie 1982 125 p refs Sponsored by Deutsche Forschungsgeneinschaft

(SER-B-263-Mitt-166; ISSN-0071-9196) Avail: NTIS HC A06/MF A01

Data evaluation shows that the precision of mean sea surface determination in regional areas using SEASAT-1 altimetry is >+or-0.1m, which agrees with the noise level of the altimeter. An excellent tidal model and a high quality altimetry adjustment model must be used. Verification of high precision tidal models is possible at the subdecimeter level, if altimeter data from a sufficient number of collinear passes are available. Accuracy validation of SEASAT-1 altimetry is restricted by the limited accuracy of the gravimetric ground truth; even with a refined computational model it is impossible to determine a gravimetric geoid with 0.10 m accuracy due to the limited accuracy of the available 1 x1 deg gravity anomalies. SEASAT-1 altimetry accuracy is proved to be >+or-0.24 m by comparison with the gravimetric geoid GGNS3; much of the discrepancy between SEASAT-1 mean sea surface heights and the gravimetric geoid is produced by errors of the 1 x1 deg gravity anomalies. Author (ESA)

N84-17682# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.

REPORT FROM THE URSI COMMISSION F SYMPOSIUM ON WAVE PROPAGATION AND REMOTE SENSING

Lars Falk Sep. 1983 19 p In SWEDISH; ENGLISH summary Symp. held in Louvain-la-Neuve, Belgium, 9-15 Jun. 1983

(FOA-C-30340-E2; ISSN-0347-3708) Avail: NTIS HC A02/MF A01; Research Inst. of National Defence, Stockholm KR 50

Atmospheric absorption of microwaves; propagation along ground and satellite links; remote sensing methods for the Earth surface and atmosphere; multipath transmission; atmospheric refraction; radiometry; scattering theory; and radar measurements were discussed. Author (ESA)

N84-17683# University Coll., London (England). Mullard Space Science Lab.

A STUDY OF SATELLITE RADAR ALTIMETER OPERATION OVER ICE-COVERED SURFACES

C. G. Rapley, H. D. Griffiths, V. A. Squire (Scott Polar Research Inst.), M. Lefebvre (CNES, Toulouse, France), A. R. Birks (Science Research Council, Chilton, England), A. C. Brenner (EG and G Washington Analytical Services Center, Inc., Riverdale, Md.), C. Brossier (CNES, Toulouse, France), L. D. Clifford, A. P. B. Cooper (Scott Polar Research Inst.), A. M. Cowan (Scott Polar Research Inst.) et al Paris ESA May 1983 234 p refs

(Contract ESA-5182/82/F-CG(SC))

(ESA-CR(P)-1810) Avail: NTIS HC A17/MF A01

The importance of the cryosphere and its interaction with other natural systems is described, and the potential contribution of radar altimetry to the understanding of cryospheric processes is outlined. The principles of radar altimetry are discussed, and beam-limited and pulse-limited modes of operation are compared. Pulse-limited operation over simple and complex surfaces, and performance requirements of an altimeter for ice studies are considered. Facets of the technical design of the SEASAT altimeter are shown to have reduced performance over ice. Modifications are described and the results of tests using ice surface and instrument simulation software are given. Author (ESA)

N84-17684# Arizona Univ., Tucson. Coll. of Earth Sciences.

GEOPHYSICAL EXPLORATION SURVEYS FOR GROUND WATER IN THE SAN PEDRO BASIN, ARIZONA

J. S. Sumner and P. F. Halvorson Aug. 1983 34 p refs Prepared in cooperation with Arizona Water Resources Research Center, Tucson

(Contract DI-14-34-0001-1103)

(PB84-110808; W84-00007; OWRT-A-108-ARIZ(1)) Avail: NTIS HC A03/MF A01 CSCL 08I

To increase knowledge of the subsurface geology in the San Pedro Valley, Southeastern Arizona, several hundred additional gravity measurements were taken in the region. The primary

purpose of the gravity research was to obtain more information about the thickness and extent of the water-bearing alluvium in the San Pedro Basin. Two-dimensional cross-sectional models of the best gravity profiles were generated. Geologic information, especially in the way of formation density values, was added to the gravity models whenever possible. The gravity station density of the southern part of the study area (upper San Pedro Basin) was such that a three-dimensional subsurface model can be developed. GRA

N84-17685# North Dakota Geological Survey, Grand Forks.
GEOLOGICAL AND GEOCHEMICAL CONTROLS ON THE CHEMICAL EVOLUTION OF SUBSURFACE WATER IN UNDISTURBED AND SURFACE-MINED LANDSCAPES IN WESTERN NORTH DAKOTA Progress Report, 1 Oct. 1979 - 30 Jun. 1982
G. H. Groenewold, R. D. Koob, G. J. McCarthy, B. W. Rehm, and W. M. Peterson May 1983 292 p refs
(Contract DI-BM-J0275010)
(PB84-126952; BM-OFR-202-83) Avail: NTIS HC A13/MF A01 CSCL 08D

The hydrogeochemical model was refined. With particular emphasis on the sulfur cycle, to determine the applicability of the model to postmining (spoils) landscapes. Field activities included detailed ground water instrumentation of undisturbed and spoils areas at two mine sites. Refinement of the model included detailed analyses of the texture, bulk and clay mineralogy, sulfide abundance, and sulfur concentrations in overburden core samples. Laboratory experiments were designed to determine the source and mechanisms of sulfate salt production from overburden samples. It was concluded that the hydrogeochemical model is equally applicable to undisturbed and spoils landscapes and that the major species of concern in this region are sodium and sulfate. It was also concluded that the major source of sulfate is sulfides in the overburden and that the solubility of sulfate in ground water in these settings is largely controlled by the sodium-calcium ratio. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N84-17686*# Martin Marietta Aerospace, Denver, Colo. Power Systems Section.
POWER SUBSYSTEM AUTOMATION STUDY Final Report
M. S. Imamura, R. L. Moser, and M. Veatch Nov. 1983 281 p refs
(Contract NAS8-34938)
(NASA-CR-170974; NAS 1.26:170974; MCR-83-645) Avail: NTIS HC A13/MF A01 CSCL 10B

Generic power-system elements and their potential faults are identified. Automation functions and their resulting benefits are defined and automation functions between power subsystem, central spacecraft computer, and ground flight-support personnel are partitioned. All automation activities were categorized as data handling, monitoring, routine control, fault handling, planning and operations, or anomaly handling. Incorporation of all these classes of tasks, except for anomaly handling, in power subsystem hardware and software was concluded to be mandatory to meet the design and operational requirements of the space station. The key drivers are long mission lifetime, modular growth, high-performance flexibility, a need to accommodate different electrical user-load equipment, onorbit assembly/maintenance/servicing, and potentially large number of power subsystem components. A significant effort in algorithm development and validation is essential in meeting the 1987 technology readiness date for the space station. Author

N84-17687# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
PHOTOCHEMICAL ENERGY STORAGE (PHOTOSENSITIZED ISOMERIZATION OF NORBORNADIENE TO QUADRICYCLANE BY COPPER (I) COMPLEXES) Ph.D. Thesis
D. J. Fife 1983 205 p
(AD-A135363; AFIT/CI/NR-83-66D) Avail: NTIS HC A10/MF A01 CSCL 10/3

This research has focused on the sensitized photoisomerization step of a solar energy storage system based on the interconversion of norbornadiene (NBD) and quadricyclane (Q). Sensitizers studied in the photoisomerization were arylphosphine complexes of copper(I) halides (Ph3P)3CuX, (MePh2P)3CuX, (DIPHOS)CuC1; X = C1, Br, I and DIPHOS = Ph2P(CH2)2PPh2). The lowest electronic excited state of the complexes can be an effective triplet energy sensitizer as evidenced by a maximum quantum yield of 1.0 with (MePh2P)3CuX. The sensitization mechanism of the L3CuX complexes is proposed as a bimolecular energy transfer process in which energy transfer takes place through the metal centered orbitals. The efficiency of the (MePh2P)3CuX sensitizers is unprecedented by other reported inorganic or organic sensitizers; however, ligand dissociation of the complexes in dilute solutions detracts from their otherwise attractive features. The free ligands undergo rapid photodecomposition and are extremely poor sensitizers of the NBD/Q system. GRA

N84-17688# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ADVANCED PHOTOVOLTAIC SYSTEM SIMULATOR TO DEMONSTRATE THE PERFORMANCE OF ADVANCED PHOTOVOLTAIC CELLS AND DEVICES
L. Mrig, R. DeBlasio, G. A. OSullivan (Abacus Controls, Inc.), and R. P. Tomko (Abacus Controls, Inc.) May 1983 10 p ref Presented at the 16th IEEE Photovoltaic Spec. Conf., San Diego, Calif., 27-30 Sep. 1982
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-009405; SERI/TP-214-1937; CONF-820906-38) Avail: NTIS HC A02/MF A01 CSCL 10A

This paper describes a photovoltaic system simulator for characterizing and evaluating the performance of advanced photovoltaic cells, modules, and arrays as well as for simulating the operation of advanced conceptual photovoltaic systems. The system simulator is capable of extrapolating the performance from a single laboratory cell, or of a module to power levels up to 10 kW. The major subsystems comprising the system simulator are (1) Solar Array Simulator, (2) Power Conditioning Unit, (3) Load Controller and Resistive Load Unit, (4) Data Acquisition and Control Unit, and (5) Cell Test Bed. DOE

N84-17689# Acurex Corp., Mountain View, Calif.
LINEAR FRESNEL LENS PHOTOVOLTAIC CONCENTRATOR PROGRAM
J. Kull, R. Maraschin, D. Rafinejad, R. Spencer, and G. Sutton Aug. 1983 227 p
(Contract DE-AC04-76DP-00789)
(DE84-002971; SAND-83-7020) Avail: NTIS HC A11/MF A01

The design of a linear Fresnel lens photovoltaic concentrator panel is described. The panel consists of four concentrator modules in an integrated structure. Each module is 10 ft. long and has a 39.85 in aperture. The solar cell's active width is 0.90 in. and the cell-lens edge spacing is 23.39 in. There are 58 cells per module. A prototype panel was tested. A peak electrical efficiency of 10.5% at the operating conditions of 800 W/m(2) insolation and 900 F coolant temperature is shown. The prototype exhibits the manufacturing and assembly concepts developed. DOE

N84-17690# Texas Instruments, Inc., Dallas. Central Research Lab.
DEVELOPMENT OF A SOLAR ENERGY SYSTEM Final Report
E. L. Johnson May 1983 493 p refs

(Contract DE-FC01-79ER-10000)
(DE83-014236; DOE/ER-10000/T4) Avail: NTIS HC A21/MF A01

In the TI solar energy system (TISES) concept in which conversion is accomplished by operation of small silicon solar cells immersed in an electrolyte, and the current generated by the cells is used to separate the electrolyte into its constituent parts is outlined. These parts can be stored separately until needed and then recombined in a fuel cell to produce electrical energy. The concept encompasses not only the efficient conversion of solar energy but also efficient storage and use of converted solar energy and efficient use of materials for the purpose. The system is composed of four main components: the solar chemical converter (SCC), hydrogen storage, a fuel cell, and a heat exchanger. The only input is solar radiation, and the output is electrical and thermal energy. The development of the key components (SCC, hydrogen storage, fuel cell, and thermal management system) and that integration into a development prototype system to demonstrate that the approach is viable and worthy of pursuit to commercialization is discussed. DOE

N84-17691# Texas Univ., El Paso. Dept. of Mechanical and Industrial Engineering.
THERMAL AND ELECTRIC ENERGY AND DESALINATION WITH A SALT GRADIENT SOLAR POND Final Report
Robert L. Reid 31 Aug. 1983 50 p Sponsored in part by Texas Energy and Natural Resources Advisory Council, the Bureau of Reclamation, Dept. of the Interior, El Paso Electric Co. and Bruce Foods Corp.
(TENRAC Proj. 82-S-U-1)
(DE84-900416; TENRAC/EDF-117) Avail: NTIS HC A03/MF A01

A 3355 m(2) (0.83 acre) storage pond in El Paso, Texas is converted to a salt gradient solar pond. The existing pond has a Hypalon rubber lining and is approximately 3 m deep. Approximately 1.8 x 10(6) kg of salt was obtained for only the cost of shipping from the source located 322 km from the El Paso pond. The lower storage zone in the pond will be 1.5 m in thickness while the nonconvecting gradient zone will be 1.2 m thick and the upper convecting zone will be 0.3 m thick. The following tasks were completed: transport and management of the salt, pond clean up and liner inspection, preparation of a work plan and schedule, selection of the methods for disolution and separation of insolubles based on laboratory tests, development of an economic computer program, and parametric studies with the SOLPOND simulation programs. DOE

N84-17692# Sandia Labs., Albuquerque, N. Mex. Thermophysical Properties Div.
STUDY OF THERMAL FATIQUE OF SOLDERED PHOTOVOLTAIC CELLS BY THERMAL RESISTANCE MEASUREMENT
E. P. Roth 1983 11 p refs Presented at the 11th DOE/SNLA Photovoltaic Concentrator Proj. Integration Meeting, Albuquerque, N.Mex., 13 Dec. 1983
(Contract DE-AC04-76DP-00789)
(DE84-003764; SAND-83-2417C; CONF-831248-1) Avail: NTIS HC A02/MF A01

To determine the degree of solder joint failure as a function of temperature and time, the degree of solder debonding after a schedule of controlled thermal cycles was measured. The degree of debonding was determined by measuring the thermal resistance of the cell substrate heat sink stack. The thermal resistance was determined by measuring the cell temperature rise resulting from the passage of a large dc electrical current through the cell. The temperature rise was determined by first calibrating the dark forward voltage of the cell as a function of temperature and then measuring the change in this voltage as a function of time after the removal of the electrical heating current. DOE

N84-17693# Texas Instruments, Inc., Dallas. Central Research Lab.
DEVELOPMENT OF A SOLAR ENERGY SYSTEM: EXECUTIVE SUMMARY Final Technical Report
E. L. Johnson May 1983 41 p
(Contract DE-FC01-79ER-10000)
(DE83-014392; DOE/ER-10000/T3) Avail: NTIS HC A03/MF A01

In the TI solar energy system (TISES) concept, conversion is accomplished by operation of small silicon solar cells immersed in an electrolyte and the current generated by the cells is used to separate the electrolyte into its constituent parts. These parts can be stored separately until needed and then recombined in a fuel cell to produce electrical energy. The concept encompasses the efficient conversion of solar energy and efficient storage and use of converted solar energy and efficient use of materials for the purposes. The system is composed of four main components: the solar chemical convertor (SCC), hydrogen storage, a fuel cell, and a heat exchanger. The only input is solar radiation, and the output is electrical and thermal energy. The development of the key components, SCC, hydrogen storage, fuel cell, and thermal management system, and their integrateion into a development prototype system to demonstrate that the approach is viable and worthy of pursuit to commercialization is outlined. DOE

N84-17694# AEG-Telefunken, Wedel (West Germany).
DEVELOPMENT OF TECHNOLOGIES FOR VERY THIN SOLAR CELLS Final Report, Jun. 1979
Klaus-Dieter Rasch and Helmut Bebermeier Bonn Bundesministerium fuer Forschung und Technologie Oct. 1983 74 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-83-024; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,50

Improvement of electrical conversion efficiency and power-to-weight ratio of solar cells under orbit conditions is considered. An IR back side reflector was added to reduce the operating temperature. A very thin solar cell of thickness 50 microns was introduced. Humidity tests, tape peel tests, thermal shock test and radiation tests were carried out to improve wafer preparation and metallization of the solar cells. Due to lower equilibrium temperature the conversion efficiency is increased by 10%. By reducing the thickness from 200 microns to 50 microns it is possible to increase the power-to-weight ratio by 22.5%. Author (ESA)

N84-17695# AEG-Telefunken, Wedel (West Germany).
DEVELOPMENT OR A SOLAR CELL COVERGLASS ADHESIVE FOR SPACE APPLICATION Final Report, Jun. 1981
Juergen Koch Bonn Bundesministerium fuer Forschung und Technologie Oct. 1983 66 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-83-029; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14

A mixed silicone rubber adhesive for solar cells was developed, manufactured, and tested with respect to flow properties, optical data, mechanical data, processibility, adhesiveness, and weldability. Viscosity at 23 C of constituent A is 6.290 m Pa sec; viscosity at 25 C of constituent B is 224 sqmm/sec; proportion of mixture is 9 to 1, fabrication time at 23 C = 120 min.
Author (ESA)

N84-17696# Maschinenfabrik Augsburg-Nuernberg A.G., Munich (West Germany). Abteilung EPS.
SUPPORT DEVELOPMENT PROGRAM FOR THE QUALIFICATION OF SOLAR FARM COLLECTORS Final Report, Jun. 1982
Gerd Hanselmann Bonn Bundesministerium fuer Forschung und Technologie Oct. 1983 53 p refs In GERMAN; ENGLISH summary Sponsored bu Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-207; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Gemany DM 11,50

A support development program for the solar farm module

Helioman 3/32 M3 is presented. It includes module configuration; module components, construction description, and development works, wind tunnel experiments; technical documentation for fabrication, control, and operation; and layout, building, testing and optimization of the appliances. Author (ESA)

N84-17225*# Rockwell International Corp., Seal Beach, Calif. Shuttle Integration and Satellite Systems Div.
LOW CONCENTRATION RATIO SOLAR ARRAY STRUCTURAL CONFIGURATION
S. J. Nalbandian *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 185-198 refs (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 10A

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N84-17697*# George Washington Univ., Washington, D.C. School of Engineering and Applied Science.
A PROGRAM OF RESEARCH IN ENVIRONMENTAL MODELING Final Report, 1 Apr. 1980 - 31 Aug. 1982
[1983] 3 p refs
(Contract NCC1-39)
(NASA-CR-173281; NAS 1.26:173281) Avail: NTIS HC A02/MF A01 CSCL 13B

A theoretical framework for the interpretation of satellite measurements of stratospheric temperature and trace gases is provided. This problem is quite complicated since the distributions of trace gases are dependent on dynamics and photochemistry. Therefore, the problem was attacked with models employing varying degrees of photochemical and dynamical complexity. The relationship between dynamics and trace gas transport and wave transience, dissipation and critical levels and the net (permanent) transport of trace gases, the role of photochemistry in trace gas transport, photochemistry and dynamics and altering the mean-zonal distribution of stratospheric ozone, and approximations to simplify the interpretation of observations and General Circulation Models are discussed. Author

N84-17698# Army Natick Research and Development Command, Mass.
REACTIVITY OF TNT AND TNA-MICROBIAL REDUCTION PRODUCTS WITH SOIL COMPONENTS Final Report
D. L. Kaplan and A. M. Kaplan Jul. 1983 44 p
(AD-A135512; NATICK/TR-83/041) Avail: NTIS HC A03/MF A01 CSCL 07/3

The results of preliminary studies with TNT and TNT-reduction products and soil components are presented. The findings indicate the potential for binding reactions between some of these compounds and humic acid, as well as for peroxidase catalyzed reactions with one TNT-reduction product. There is a need for continued effort in these areas to fully understand the implications of these types of reactions in regards to the fate of munitions compounds in soils. Author (GRA)

N84-17699# Argonne National Lab., Ill.
EVALUATION OF WIND FIELD INTERPOLATION SCHEMES USED IN STUDIES OF REGIONAL-SCALE POLLUTANT TRANSPORT
C. M. Sheih 1983 6 p ref Presented at the Intern. Spec. Conf. on the Meteorology of Acidic Deposition, Hartford, Conn., 16 Oct. 1983
(Contract W-31-109-eng-38)
(DE84-003634; CONF-8310220-1) Avail: NTIS HC A02/MF A01

Numerical simulations of regional scale pollutant transport often use wind fields interpolated from observational data of insufficient spatial resolution. Wind data are interpolated to transient puff positions in Lagrangian models, or to a fixed horizontal grid of about 50 to 100 km spacing in Eulerian finite difference models. The most common interpolation schemes used in regional scale simulation are: (1) inverse distance weighting; (2) inverse distance squared weighting; (3) inverse distance squared and directional weighting; and (4) nearest station. DOE

N84-17700# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
ATMOSPHERIC DEPOSITION TO FORESTS
Gary M. Lovett 1983 34 p refs Presented at the US/Can. Conf. on Forest Responses to Acidic Deposition, Orono, Maine, 3 Aug. 1983
(Contract W-7405-eng-26)
(DE84-003384; CONF-8308115-2) Avail: NTIS HC A03/MF A01

The processes of wet and dry deposition in forests are described with special reference to the northeastern United States and to chemical species important in acidic deposition. Both meteorological and chemical factors influence the acidity of precipitation. The best long term data record for the northeastern United States indicates no significant trend in rainfall acidity in the period of record (1964 to 1980), the data indicate however that nitric acid has increased in importance relative to sulfuric acid in its contribution to that acidity. Deposition decreases along a southwest to northeast transect through the northeastern states. Deposition to high elevation ecosystems is several fold higher than deposition to nearby lowland ecosystems because of increased rain and snowfall, the effect of cloud water deposition, and possibly increased dry deposition. It is suggested that particle deposition is important for alkaline materials, such as soil dust, and gaseous deposition to be important for H( ), N, and S. The importance of dry deposition relative to wet deposition increases with increasing proximity to pollution source areas. The forest canopy influences atmospheric deposition to the forest floor by taking up or releasing nutrients and strong acidity, releasing weak acidity, and trapping dry depositions. DOE

N84-17701# Argonne National Lab., Ill. Environmental Research Div.
ESTIMATION OF NORTH AMERICA ANTHROPOGENIC SULFUR DEPOSITION AS A FUNCTION OF SOURCE/RECEPTOR SEPARATION
Jack D. Shannon 1983 8 p ref Presented at the 14th Intern. Tech. Meeting on Air Pollution Modeling and Its Appl., Copenhagen, 27 Sep. 1983
(Contract W-31-109-eng-38)
(DE84-003638; CONF-8309130-4) Avail: NTIS HC A02/MF A01

The US and Canadian emissions of anthropogenic sulfur were combined and the deposition contributions from sources located within 200 km, from 200 to 500 km, from 500 to 1000 km, and more than 1000 km from each receptor were calculated separately. It is shown that local sources have a much greater relative contribution to dry deposition than to wet deposition. This is due to the fact that dry deposition, for a given surface and atmospheric stability, is directly proportional to surface concentration, which for a primary pollutant steadily decreases away from sources due to depletion and vertical dilution, while wet deposition is episodic and removes pollutants from a greater depth of the atmosphere. The influence of distant sources is relatively greater in eastern Canada than in the eastern US. It is indicated that sulfur deposition results from a wide distribution of sources, particularly in the case of wet deposition. It is inferred that a policy to reduce total sulfur deposition by a specified proportion in sensitive areas would not need to be as broadly based as a program to reduce wet deposition by that proportion since the relative local source contribution to dry deposition appears to be greater than that for wet deposition. DOE

N84-17702# Oak Ridge National Lab., Tenn. Chemistry Div.
CHEMICAL AND BIOLOGICAL PROCESSES IN CO/SUB 2-OCEAN MODELS
C. F. Baes, Jr. and G. G. Killough 1983 30 p refs Presented at the Global Carbon Cycle: Analysis of the Natural Cycle and Implications of Anthropogenic Alterations for the next Century, Knoxville, Tenn., 31 Oct. 1983

(Contract W-7405-eng-26)
(DE84-003304; CONF-831048-2) Avail: NTIS HC A03/MF A01

Models to predict the response of the oceans, to increasing atmospheric CO2 over the next 100 years are outlined. It is suggested that besides ocean circulation the models should include the inorganic and organic chemistry of carbon. A two dimensional model intended to be such a representation is measured. It consists of an array of boxes arranged in isothermal layers. Water exchange between boxes of the same temperature and exchange between boxes of different temperature is parameterized with flux coefficients. The exchange of CO2 between the atmosphere and a surface box at each temperature is approximated as a linear function of dissolved inorganic carbon (TC) and alkalinity (TA). The photosynthesis rate and calcium carbonate production is assumed proportional to the dissolved nutrient (nitrate) in these surface boxes. Constant dentrital fallout velocities are used and the dissolution of organic dentritus in the deep ocean is assumed proportional to its local concentration. Steady state calculations illustrate the substantial effects on carbon distribution between ocean and atmosphere of: (1) elimination of photosynthesis; (2) increased nutrient concentration; (3) decreased circulation rate; and (4) increased atmospheric CO2. DOE

N84-17703# Oak Ridge National Lab., Tenn. Energy Div.
CAN WE DELAY A GREENHOUSE WARMING
A. M. Perry 1983 3 p Presented at the Global Carbon Cycle: Analysis of the Natural Cycle and Implications of Anthropogenic Alterations for the Next Century, Knoxville, Tenn., 31 Oct. - 2 Nov. 1983
(Contract W-7405-eng-26)
(DE84-003390; CONF-831048-1) Avail: NTIS HC A02/MF A01

The EPA report dated September 1983 Can We Delay A Greenhouse Warming is commented on. Exception is made to the widely held interpretation that the answer is not much. The contribution of other greenhouse gases such as methane and nitrous oxide to the EPA scenarios is pointed out, and the lack of understanding of their role is emphasized. DOE

N84-17704# Essen Univ. (West Germany). Inst. for Mechanical Engineering.
EXPERIMENTAL INVESTIGATION CONCERNING THE FEASIBILITY OF ELECTROSTATIC PRECIPITATORS AT HIGH PRESSURES AND TEMPERATURES Final Report, Mar. 1982
Ekkehard Weber and H. G. Pape Bonn Bundesministerium fuer Forschung und Technologie Sep. 1982 93 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-201; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,50

Gas cleaning systems for coal conversion, operating at high pressures and temperatures are considered. The applicability of an electrostatic precipitator at temperatures up to 1000 C and pressures up to 40 bar was studied. Measurements for different states of gas and various separator dimensions were carried out. It is shown that electrostatic precipitation is possible under extreme gas conditions allowing high degrees of separation. Author (ESA)

N84-17705# Research Inst. of National Defence, Umea (Sweden). Dept. 4.
AIRBORNE FALLOUT MONITORING
Goeran Hulten, Rune Jossefsson (Norrbottens armeflygbataljon), and Raymond Brisenfeldt (Armeflygskolan) May 1983 30 p refs In SWEDISH; ENGLISH summary
(FOA-A-40045-A3; ISSN-0281-0220) Avail: NTIS HC A03/MF A01; Research Inst. of National Defence, Stockholm KR 50

Surveying of large areas of fallout from an aircraft is discussed. It is not necessary to use advanced systems for height determinations as uncertainty for conversion factors for different heights is small compared to overall uncertainty. Aerial survey may be carried out along a road, over a certain point, or over a certain area. The aircraft follows a predicted timetable to correlate measuring points and radiation intensity. Utilization of plastic films with printed grids is suggested. Flight heights should be 25 m and speed 150 or 180 Km/hr relative to the ground. Author (ESA)

N84-17706# Royal Netherlands Meteorological Inst., De Bilt.
DISPERSION EXPERIMENTS WITH SULFUR HEXAFLUORIDE FROM THE 213M HIGH METEOROLOGICAL MAST AT CABAUW IN THE NETHERLANDS
R. Agterberg, F. T. M. Nieuwestadt, H. vanDuren (Kema Labs.), A. J. Hasselton (Kema Labs.), and G. D. Krijt (Kema Labs.) Jan. 1983 129 p refs
Avail: NTIS HC A07/MF A01

The tracer SF6 was released from a mast at a height of 80 m or 200 m in order to study pollution dispersion from stacks. Ground level concentration distribution was sampled along a measuring arc 4 km downwind from the mast. Wind velocity profiles, wind direction, temperature and turbulence were measured along the mast. Radiosonde soundings, acoustic radar observations, radiation measurements and synoptical observations were also taken. Runs consisted of 2 consecutive dispersion experiments of 30 min each. The complete data set of the tracer measurements and the meteorological observations obtained during 15 runs is presented. Author (ESA)

N84-17707# Research Inst. of National Defence, Umea (Sweden). Dept. 4.
RISK MODELS FOR RISK DISTANCE PREDICTION DURING RELEASE OF TOXIC INDUSTRIAL CHEMICALS CAUSED BY ACTS OF WAR
Jan-Olaf Andersson, Edvard Karlsson, Nils Karlsson, and Stellan Winter Oct. 1983 27 p refs In SWEDISH; ENGLISH summary (FOA-C-40185-C2(H2); ISSN-0347-2124) Avail: NTIS HC A03/MF A01

Risk models for predicting risk distances with respect to the civil population, were developed for the release of toxic gases, which may be caused by acts of war. Because of acute toxicity and large storage quantities, pressurized chlorine, ammonia, and sulfur dioxide represent the most serious risks. For these gases risk models were developed relating to representative small-scale (15 to 25 T) and large-scale (100 to 150 T) releases. Factors affecting the actual risk distances, as compared to the predicted distances, are discussed. For low wind speeds, a circular risk zone is applied with the accident site at the center, whereas for higher wind speeds the risk zone is designated as a 60 deg arc sector. Risk distances are given for 25% fatalities and for 25% serious injuries. Author (ESA)

N84-17708# Office of Radiation Programs, Washington, D. C.
ENVIRONMENTAL RADIATION DATA REPORT 33, JANUARY - MARCH 1983
Mar. 1983 52 p
(PB84-104785; EPA-520/5-83-016) Avail: NTIS HC A04/MF A01 CSCL 18H

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama. Data from the similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (ERD) when available. The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and tritium. GRA

N84-17709# Office of Radiation Programs, Washington, D. C.
ENVIRONMENTAL RADIATION DATA REPORT 31, JULY - SEPTEMBER 1982
Sep. 1982 47 p
(PB84-104801; EPA-520/5-83-014) Avail: NTIS

HC A03/MF A01 CSCL 18H

Tables show radiation levels recorded for air, milk, and surface and drinking water samples. Results of radiation analyses for fission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and tritium are presented. This monitoring effort also serves to provide ancillary information on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants and natural background levels. GRA

N84-17710# Office of Radiation Programs, Washington, D. C.
ENVIRONMENTAL RADIATION DATA REPORT 32, OCTOBER DECEMBER 1982
Dec. 1982 50 p
(PB84-104793; EPA-520/5-83-015) Avail: NTIS HC A03/MF A01 CSCL 18H

Tables show results of radiation analyses for fission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and tritium as determined from samples of air, milk, and surface and drinking water. GRA

N84-17711# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
REVIEW OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR SULFUR OXIDES: ASSESSMENT OF SCIENTIFIC AND TECHNICAL INFORMATION Final Report
Nov. 1982 225 p refs
(PB84-102920; EPA-450/5-82-007) Avail: NTIS HC A10/MF A01 CSCL 13B

This paper evaluates and interprets the available scientific and technical information that EPA staff believes is most relevant to the review of primary (health) and secondary (welfare) National Ambient Air Quality Standards for sulfur oxides (SOx) and presents staff recommendations on alternative approaches to reaffirming or revising the standards. The assessment is intended to bridge the gap between the scientific review in the EPA criteria document for particulate matter and sulfur oxides and the judgements required of the Administrator in setting ambient air quality standards for sulfur oxides. GRA

N84-17712# Environmental Protection Agency, Research Triangle Park, N.C. Environmental Criteria and Assessment Office.
AIR POLLUTION EFFECTS ON TERRESTRIAL ECOSYSTEMS Final Report
J. H. B. Garner, Robert W. Elias, J. Michael Davis, and F. Vandiver Bradow Jun. 1983 262 p refs
(PB84-128313; EPA-600/3-83-003) Avail: NTIS HC A12/MF A01 CSCL 06F

Information on the effects of ozone, nitrogen oxides, sulfur oxides, particulate matter, and acidic disposition on terrestrial ecosystems is presented. A brief explanation of ecosystem dynamics is presented to provide a framework for discussion of air pollution effects. Deposition processes, routes, and mechanisms of entry into plants, and responses of natural ecosystems versus agroecosystems are presented. Effects of air pollutants, singly or in combination are described in terms of dose-response relationships to the extent that supporting evidence is available. Both adverse and beneficial effects, where appropriate, are addressed. GRA

N84-17713# Johns Hopkins Univ., Baltimore, Md. Dept. of Environmental Health Sciences.
EXHAUST EMISSIONS FROM A DIESEL ENGINE Final Report
Terence H. Risby Nov. 1983 113 p refs
(Grant EPA-R-806558)
(PB84-122910; EPA-600/3-83-106) Avail: NTIS HC A06/MF A01 CSCL 07D

Studies were performed using (1) diesel particles collected from the undiluted exhaust of a single-cylinder engine, operated at constant speed and load, using a binary pure hydrocarbon fuel with air or gas mixture oxidizers, and (2) diesel particles collected from the diluted exhaust of a multicylinder engine operated on a commercial fuel. The physicochemical properties of the particles were determined by static and dynamic methods. The organic adsorbate was characterized by chromatographic and mass spectrometric procedures and by microbial testing protocols. Electron paramagnetic resonance spectrometry and high performance liquid chromatography were used to study reactivity of the organic adsorbate. The particles collected from the exhaust of diesel engines operated on binary pure hydrocarbons and on commercial fuels contained similar compounds in the organic adsorbates. GRA

N84-17714# Santa Fe Research Corp., N. Mex.
EFFECTS OF DIESEL VEHICLES ON VISIBILITY IN CALIFORNIA Final Report, Aug. 1981 - Nov. 1983
John Trijonis Oct. 1983 31 p refs
(PB84-122167; ARB-R-83/217) Avail: NTIS HC A03/MF A01 CSCL 13B

The effect of diesel vehicle elemental carbon on visibility in California is estimated for 1980 and projected to the early 1990's. An emissions budget model indicates that heavy-duty diesel trucks contributed nearly one-half of statewide elemental carbon emissions in 1980 and about 5-15% of statewide light extinction (visibility reduction). A ladder tracer model indictes somewhat larger extinction contributions from heavy-duty diesel trucks, about 5 to 25% statewide in 1980. Even greater visibility impacts (too large to be reasonable) are suggested by a CO tracer model. The most uncertain aspect of the conclusions is the overall magnitude of the visibility effect predicted by the emission budget and Pb tracer models. The partition of visibility impacts among light-, medium-, and heavy-duty vehicles is more definite. Author (GRA)

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N84-17715 Academy of Sciences (USSR), Moscow. Space Research Inst.
AURORAL ION ACCELERATION
S. L. Shalimov 1983 29 p refs
(PR-783) Copyright. Avail: Issuing Activity

From the altitude of 500 km to 15 R sub E everywhere conic like distributions of H+, O+, He+ ions are moving upwards from the ionosphere along the geomagnetic field lines in the auroral zone. The distributed ions suggest the existence of ion transverse acceleration mechanisms (ITAM) acting below the observation point. The more plausible mechanisms are connected with the resonance of the type wave particle between ions and the observed EIC and LH waves and are also due to the existence of the local transverse electric fields in the ionoshere and the magnetosphere. The known ion transverse acceleration mechanisms were complemented by new results. The conical distributions of ionospheric ions at different altitudes in the auroral zone are pointed out. E.A.K.

N84-17716 Wisconsin Univ., Madison.
A STATISTICAL-DYNAMICAL STUDY OF THE LARGE-SCALE INTRASEASONAL VARIABILITY OF THE NORTHERN HEMISPHERE WINTER CIRCULATION Ph.D. Thesis
Siegfried Dieter Schubert 1983 208 p
Avail: Univ. Microfilms Order No. DA8319536

The observed wintertime intraseasonal variability of the Northern Hemisphere mid-tropospheric circulation is analyzed using a combined statistical and dynamical approach. The statistical analysis is based on an empirical orthogonal function (EOF) expansion of the 500 mb streamfunction anomalies (deviations from the climatological seasonal cycle) and includes a description and interpretation of the dominant modes. The dynamical analysis involves entering these modes into an equivalent barotropic model in an attempt to gain further insight into the important dynamical processes governing their behavior. The importance of the terms

involving boundary parameterizations is determined from a least squares fit. A major result of this study is the identification of the zonally varying wintertime mean flow as a potentially important energy source for some of the dominant EOF's: these include the first three EOF's which are associated with a range of behavior encompassing an index cycle, the Pacific/North American pattern, and the North Atlantic oscillation. Dissert. Abstr.

N84-17717 California Inst. of Tech., Pasadena.
A SEARCH FOR GRAVITATIONAL RADIATION FROM PSR 1937 + 214 Ph.D. Thesis
Mark Hereld 1984 106 p
Avail: Univ. Microfilms Order No. DA8325743

A search for gravitation from the millisecond pulsar, PSR 1937 + 214, using a 40 meter baseline laser interferometric detector is described. Four days of observation yielded 1.2 x 10 to the 5th power seconds of data. Throughout the experiment, the pulsar phase was synthesized to an accuracy of better than one tenth of the pulsar period. A trigger generated from this signal synchronized the data averaging. Narrow band amplitude spectra centered at the pulsar's fundamental electromagnetic pulsation frequency (approximately 642 Hz) and its first harmonic were obtained. The spectra, one for each combination of polarization and center frequency, place 99.7% confidence level limits on the emitted gravitational radiation. Dissert. Abstr.

N84-17718*# Dartmouth Coll., Hanover, N.H. School of Engineering.
MAGNETOPAUSE STUDIES USING DATA FROM THE ISEE MISSION Final Technical Report, 1 May 1979 - 30 Sep. 1983
Bengt U. O. Sonnerup 30 Sep. 1983 63 p refs
(Grant NsG-5348)
(NASA-CR-175208; NAS 1.26:175208) Avail: NTIS HC A04/MF A01 CSCL 04A

Magnetic field reconnection at the magnetopause and the energy balance are considered. For individual titles, see N84-17719 through N84-17720.

N84-17719*# Dartmouth Coll., Hanover, N.H.
MAGNETIC FIELD RECONNECTION AT THE MAGNETOPAUSE: AN OVERVIEW Final Report
Bengt U. O. Sonnerup *In its* Magnetopause Studies Using Data from the ISEE Mission 30 Sep. 1983 31 p refs (For primary document see N84-17718 08-46)
Avail: NTIS HC A04/MF A01 CSCL 04A

The basic qualitative and quantitative aspects of reconnection in its magnetopause setting are summarized. First, the basic morphological and dynamic features of asymmetric reconnection are examined with emphasis on the important role played by the rotational discontinuity in these geometries. Second, the structure and other properties of rotational discontinuities are discussed. Third, the manner in which individual particles are energized or de-energized during their interaction with current layers in general, and rotational discontinuities in particular, is examined. Finally, the question of nonsteady, localized reconnection and its relation to flux transfer events is discussed and a qualitative model is proposed to describe these phenomena. Author

N84-17720*# Max-Planck-Institut fuer Extraterrestrische Physik, Garching (West Germany).
ISEE OBSERVATIONS OF MAGNETOPAUSE RECONNECTION: THE ENERGY BALANCE Final Report
G. Paschmann, I. Papamastorakis, N. Sckopke, Bengt U. O. Sonnerup (Dartmouth College), S. J. Bame (Los Alamos National Lab.), and C. T. Russell (California Univ., Los Angeles) *In its* Magnetopause Studies Using Data from the ISEE Mission 30 Sep. 1983 25 p (For primary document see N84-17718 08-46)
Avail: NTIS HC A04/MF A01 CSCL 04A

The total energy balance for two events with the objective of obtaining check on the interpretation in terms of reconnection is examined. To within experimental uncertainties, the plasma and magnetic field data are consistent with reconnection. An enthalpy increase comparable to the kinetic energy increase occurs in the magnetopause. Thus substantial dissipation is present in the rotational discontinuity. An ion heat flow associated with a beam of reflected magnetosheath particles carried away some 20% of the total converted electromagnetic energy. Author

N84-17721# Illinois Univ., Urbana. Aeronomy Lab.
RESEARCH IN AERONOMY Progress Report, 1 Oct. 1982 - 31 Mar. 1983
Penny Roth, ed. 31 Mar. 1983 64 p refs
(Grants NGL-14-005-1817; NsG-7506; NSF ATM-80-19563; NSF ATM-81-17440; NSF ATM 81-20371; NSF ATM-82-04041)
(NASA-CR-175370; NAS 1.26:175370; PR-83-1) Avail: NTIS HC A04/MF A01 CSCL 04A

Rocket experiments are described. Launch operations and radio propagation experiments in Peru, probe fine structure experiment, and energetic particle experiments are discussed. Meteor radar is discussed. Coherent and incoherent scatter radar are also discussed. VHF radio signals scattered from the equational mesophere, tropospheric-stratospheric reflection and coupling, and data collection hardware are covered. Laser radar is addressed. A preprocessor for the sodium Lidar system, preparations for an airborne Liden test, and correlatine Liden and meteor radar measurements are covered. Author

N84-17722*# Johns Hopkins Univ., Baltimore, Md. Dept. of Earth and Planetary Sciences.
THE DELINEATION AND INTERPRETATION OF THE EARTH'S GRAVITY FIELD Final Technical Report, 1 Apr. 1982 - 30 Mar. 1983
Bruce D. Marsh 1983 40 p refs
(Grant NAG5-32)
(NASA-CR-173310; NAS 1.26:173310) Avail: NTIS HC A03/MF A01 CSCL 08N

The observed changes in velocity with time are reduced relative to the well-determined low degree and order GEM field model and accelerations are found by analytical differentiation of the range rates. This new map is essentially identical to the first map and we have produced a composite map by combining all 90 passes of SST data. The resolution of the map is at worst about 5 deg and much better in most places. A comparison of this map with conventional GEM models shows very good agreement. A reduction of the SEASAT altimeter data has also been carried out for an additional comparison. Although the SEASAT geoid contains much more high frequency information, it agrees very well with both the SST and GEM fields. The maps are dominated (especially in the east) by a pattern of roughly east-west anomalies with a transverse wavelength of about 2000 km. A further comparison with regional bathymetric data shows a remarkably close correlation with plate age. Author

N84-17723*# California Inst. of Tech., Pasadena. Seismological Lab.
TELESEISMIC ARRAY ANALYSIS OF UPPER MANTLE COMPRESSIONAL VELOCITY STRUCTURE Ph.D. Thesis
Marianne Carol Walck 16 Feb. 1984 242 p refs
(Grant NsG-7610; Contract DI-14-08-0001-19720; Grants NSF EAR-78-03654; NSF EAR-8115236)
(NASA-CR-173285; NAS 1.26:173285) Avail: NTIS HC A11/MF A01 CSCL 08G

Relative array analysis of upper mantle lateral velocity variations in southern California, analysis techniques for dense data profiles, the P-wave upper mantle structure beneath an active spreading center: the Gulf of California, and the upper mantle under the Cascade ranges: a comparison with the Gulf of California are presented. Author

N84-17724# Council for Scientific and Industrial Research, Pretoria (South Africa). Foreign Language Service.
POSSIBILITY OF INVESTIGATION OF KIMERLITE PIPES BY SUPERCONDUCTIVE GEOMAGNETIC VARIATION MEASURING STATIONS
S. I. Bondarenko 1983 12 p refs Transl. into ENGLISH from Geol. Geofiz. (USSR), no. 11, Nov. 1981 p 108-114

(CSIR-Trans-1701) Avail: NTIS HC A02/MF A01

Tests to study the possibilities of investigating kimberlite pipes by means of superconductive geomagnetic variation recording stations with three-component magnetometers and Josephson contacts and with a sensitivity of 10(-8) ergs in the 10(-3) - 1 Hz frequency range and a zero-point stability of not less than 2.10(-8) ergs/hour, confirmed the phenomenon of quantum interference with superconductor contours. This effect is of great value in determining kimberlite pipe boundaries: contouring, determination of magnetic susceptibility of kimberlite, etc. Author

N84-17725*# Texas Univ., Austin. Marine Geophysics Lab.
EARTH STRAIN MEASUREMENTS WITH THE TRANSPORTABLE LASER RANGING SYSTEM: FIELD TECHNIQUES AND PLANNING Final Report, Dec. 1979 - Nov. 1982
Yosio Nakamura, H. James Dorman, and Thomas Cahill Nov. 1982 42 p refs
(Contract NAS5-25897)
(NASA-CR-175150; NAS 1.26:175150) Avail: NTIS HC A03/MF A01 CSCL 08G

The potential of the transportable laser ranging system for monitoring the ground deformation around satellite ranging stations and other geodetic control points was examined with emphasis on testing the usefulness of the relative alteration technique. The temporal variation of the ratio of the length of each survey line to the mean length of all survey lines in a given area is directly related to the mean shear strain rate for the area. The data from a series of experimental measurements taken over the Los Angeles basin from a TLRS station at Mt. Wilson show that such ratios can be determined to an accuracy of one part in 10 million with a measurement program lasting for three days and without using any corrections for variations in atmospheric conditions. A numerical experiment using a set of hypothetical data indicates that reasonable estimates of the present shear strain rate and the direction of the principal axes in southern California can be deduced from such measurements over an interval of one to two years. Author

N84-17726*# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
ATMOSPHERIC PLANETARY-WAVE RESPONSE TO EXTERNAL FORCING Semiannual Status Report
Duane E. Stevens and Elmar R. Reiter Aug. 1983 6 p refs
(Grant NAG5-136)
(NASA-CR-175165; NAS 1.26:175165) Avail: NTIS HC A02/MF A01 CSCL 04A

A summary of the progress report is given, covering the following areas: atmospheric circulation, planetary waves, adaption of the model to the Cyber 205, continental heat flux anomalies, and nonlinear evolution of inertial instabilities in the tropics. B.G.

N84-17727*# Pittsburgh Univ., Pa. Dept. of Geology and Planetary Science.
LITHOLOGICAL CHARACTERIZATION OF CRYSTALLINE BASEMENT ROCK PROVINCES OF THE INTERIOR OF THE UNITED STATES Final Report
Edward G. Lidiak Nov. 1983 160 p
(Grant NsG-5270)
(NASA-CR-175180; NAS 1.26:175180) Avail: NTIS HC A08/MF A01 CSCL 08G

Data acquisition and evaluation, basement geologic provinces, basement ages and tectonic provinces, configuration of the basement surface, and various abstracts and preprints are provided. Author

N84-17728*# California Inst. of Tech., Pasadena. Seismological Lab.
SURFACE WAVE TOMOGRAPHY
Don L. Anderson [1984] 5 p refs
(Grants NsG-7610; NSF EAR-81-15236)
(NASA-CR-175373; NAS 1.26:175373) Avail: NTIS HC A02/MF A01 CSCL 08G

Vertically polarized shear wave velocity (VSV), determined primarily from fundamental mode Rayleigh waves, and the difference between the velocity of horizontally polarized shear waves (VSH) and VSV, therefore a measure of anisotropy, are shown. N.W.

N84-17729*# Delaware Univ., Newark. Center for Climatic Research.
A CLIMATICALLY-DERIVED GLOBAL SOIL MOISTURE DATA SET FOR USE IN THE GLAS ATMOSPHERIC CIRCULATION MODEL SEASONAL CYCLE EXPERIMENT Final Progress Report, Sep. 1980 - Jun. 1983
Cort J. Willmott and Richard T. Field 1 Feb. 1984 103 p refs
(Grant NAG5-107)
(NASA-CR-173289; NAS 1.26:173289) Avail: NTIS HC A06/MF A01 CSCL 04A

Algorithms for point interpolation and contouring on the surface of the sphere and in Cartesian two-space are developed from Shepard's (1968) well-known, local search method. These mapping procedures then are used to investigate the errors which appear on small-scale climate maps as a result of the all-too-common practice of of interpolating, from irregularly spaced data points to the nodes of a regular lattice, and contouring Cartesian two-space. Using mean annual air temperatures field over the western half of the northern hemisphere is estimated both on the sphere, assumed to be correct, and in Cartesian two-space. When the spherically- and Cartesian-approximted air temperature fields are mapped and compared, the magnitudes (as large as 5 C to 10 C) and distribution of the errors associated with the latter approach become apparent. Author

N84-17730*# Ohio State Univ., Columbus. Dept. of Physics.
THE RETRIEVAL OF ATMOSPHERIC CONSTITUENT MIXING-RATIO PROFILES FROM SOLAR ABSORPTION SPECTRA Ph.D. Thesis. Interim Technical Report
William Allen Shaffer Feb. 1983 308 p refs
(Grant NsG-7479)
(NASA-CR-173303; NAS 1.26:173303) Avail: NTIS HC A14/MF A01 CSCL 04A

Methods used to determine various atmospheric gas distributions are summarized. The experimentally determined mixing ratio profiles (the mixing ratio of a gas is the ratio of the number of gas molecules to the number of air molecules) of some atmospheric gases are shown. In most in situ experiments stratospheric gas samples are collected at several altitudes by balloon, aircraft, or rocket. These samples are then analyzed by various methods. Mixing ratio profiles of Ci, ClO, and OH were determined by laser induced fluorescence of samples. Others have analyzed gas samples by gas chromatography in order to determine the molecular abundances of CCl_2F_2, CCl_4, CCl_3F, $CFCl_3$, CF_2Cl_2, $CHClF_2$, CH_3CCl_3, CH_4, CO, $C_2Cl_3F_3$, C_2Cl_4, C_2HCl_3, C_2H_2, C_2H_4, C_2H_6, C_3H_8, C_6H_6, C_7H_8, H_2, and N_2O. S.L.

N84-17731# Boston Univ., Mass. Dept. of Astronomy.
OPTICAL, RADIO AND COMPUTER SIMULATION STUDIES OF THE BRAZIL IONOSPHERIC MODIFICATION EXPERIMENT OF 8 SEPTEMBER 1982
J. Baumgardner, M. Mendillo, B. Herniter, and H. Spence 31 Jul. 1983 33 p
(Contract F19628-81-K-0051; AF Proj. 4643; AF Proj. ILIR)
(AD-A135143; AFGL-TR-0196; SR-1) Avail: NTIS HC A03/MF A01 CSCL 04/1

The Brazil Ionospheric Modification Experiments (BIME) provided an opportunity to conduct simultaneous airglow and electron content observations during a space plasma active experiments campaign in Natal, Brazil, in September 1982. A period of background data was also obtained, and computer simulation studies were conducted for the background and artificially disturbed conditions. The BIME -1 release produced a depletion in TEC of 1-1.5 TEC units that was accompanied by an airglow burst of approximately 500 R at 6300 A. Wide-angle imaging at 6300 A revealed an airglow cloud that extended to 150 km in radius. Postmission simulation studies carried out using the Boston University Finite Element Simulation (FES) Code were in good agreement with the observations. Author (GRA)

N84-17732# Lowell Univ., Mass. Center for Atmospheric Research.
AUTOMATIC REAL TIME IONOGRAM SCALER WITH TRUE HEIGHT ANALYSIS - ARTIST
Bodo W. Reinisch, Robert R. Gamache, Jane S. Tang, and David F. Kitrosser Hanscom AFB, Mass. AFGL Jul. 1983 31 p
(Contract F19628-80-C-0064; AF Proj. 4643)
(AD-A135174; ULRF-426/CAR; AFGL-TR-83-0209; SR-7) Avail: NTIS HC A03/MF A01 CSCL 04/1

Over-the-horizon HF radar detection and sea state monitoring require fairly precise knowledge of the ionospheric reflection point. Automatic scaling of ionograms and calculation of the vertical electron density profile can provide the reflection point characteristics in real time if adequate ionosondes are available at the expected mid-points. The automatic scaling algorithm developed at the University of Lowell extracts the E and F region traces from Digisonde ionograms without any human intervention and automatically produces the corresponding electron density profiles. The algorithm was tested on several thousand Digisonde ionograms covering the four seasons, day, night, quiet and disturbed conditions, as observed at the AFGL Ionospheric Observatory, Goose Bay, Labrador. All important ionospheric parameters are automatically retrieved: foF2, foF1, fminF, MUF(3000), M(3000), range spread, frequency spread, h prime F, h prime F2, foE, foEs, fminE, h prime E, h prime Es, and signal amplitude as function of frequency. The electron density profile algorithm uses a polynomial profile-fitting method and is part of the automatic procedure.
Author (GRA)

N84-17733# Smithsonian Astrophysical Observatory, Cambridge, Mass.
A NEW MODEL OF THE GEOMAGNETIC VARIATION IN THE UPPER ATMOSPHERE Final Report, 1 Apr. 1981 - 15 Aug. 1983
Jack W. Slowey Sep. 1983 13 p
(Contract F19628-81-K-0033; AF Proj. 6690)
(AD-A135210; AFGL-TR-83-0253) Avail: NTIS HC A02/MF A01 CSCL 12/1

A new empirical model of the geomagnetic variation in the Earth's thermosphere and exosphere is presented. The form of the new model is similar to that developed earlier by Jacchia, et al., from ESRO 4 mass spectrometer data. It differs from the earlier formulation in that it incorporates the variation with local magnetic time, allows the shape of the latitudinal response to vary with the level of geomagnetic disturbance and includes a latitude-dependent term in the thermal component of the variation. A new index of disturbance is also introduced that is designed to take into account the effect of the prior heat input associated with geomagnetic activity. The model parameters are essentially those deduced from analysis of the ESRO 4 mass spectrometer data. Some refinement of the parameters is to be expected, especially in regard to separation of thermal and mass transport effects in low latitudes. Author (GRA)

N84-17734# Naval Research Lab., Washington, D. C.
NONLINEAR MODE COUPLING THEORY OF THE LOWER-HYBRID-DRIFT INSTABILITY
J. F. Drake, P. N. Guzdar, A. B. Hassam, and J. D. Huba 25 Nov. 1983 47 p
(AD-A135538; NRL-MR-5209) Avail: NTIS HC A03/MF A01 CSCL 12/1

A nonlinear mode coupling theory of the lower-hybrid-drift instability is presented. A two-dimensional nonlinear wave equation is derived which describes lower-hybrid drift wave turbulence in the plane transverse to B ($k.B = 0$), and which is valid for finite beta, collisional and collisionless plasmas. The instability saturates by transferring energy from growing, long wavelength modes to damped, short wavelength modes. Detailed numerical results are presented which compare favorably to both recent computer simulations and experimental observations. Applications of this theory to space plasmas, the Earth's magnetotail and the equatorial F region ionosphere, are discussed. Author (GRA)

N84-17735# Colorado State Univ., Fort Collins. Dept. of Physics.
PHOTON-BURST CORRELATION TECHNIQUES FOR ATMOSPHERIC CROSSWIND MEASUREMENTS Final Report, 14 Dec. 1979 - 13 Jun. 1983
C. Y. She and R. F. Kelley Sep. 1983 41 p
(Contract DAAG29-80-C-0038)
(AD-A134617; ARO-16178.6-GS) Avail: NTIS HC A03/MF A01 CSCL 04/1

With a CW visible laser, the method of photon-burst correlation is used to measure atmospheric crosswinds. A scaling law, including the effects of atmospheric turbulence, for performance evaluation of both laser Doppler (LDV) and laser time-of-flight (LTV) velocimeters, is introduced theoretically and established experimentally with field experiments. Crosswind measurements in the night at a range of 500 m with a low power argon-ion laser are reported. The measured signal particle arrival rate is consistent with the predicted arrival rate based on the scaling law. In addition to the use of higher laser power, it is suggested that with proper inclusion of signal photon bursts resulting from the simultaneous arrival of several particles, routine operation of this type of laser velocimeter for long ranges, up to 1000 m, should be feasible. Author (GRA)

N84-17736# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
REPORTS OF THE U.S. - U.S.S.R. WEDDELL POLYNYA EXPEDITION, OCTOBER-NOVEMBER 1981. VOLUME 6: UPPER-AIR DATA
E. L. Andreas May 1983 288 p
(Grants NSF DPP-80-06922; NSF DPP-81-20024)
(AD-A134871; CRREL-SR-83-13) Avail: NTIS HC A13/MF A01 CSCL 04/2

This report summarizes the most extensive set of upper-air data ever collected over Antarctic sea ice in winter, the data that we obtained using radiosondes during the U.S.-U.S.S.R. Weddell Polynya Expedition. The report includes a description of the two radiosonde systems that we used, a chronological listing of all 110 soundings that we made during the expedition, a discussion of measured and derived quantities, listings of all of the sounding data, and plots to 5 km of the potential temperature profile from each sounding. Author (GRA)

N84-17737# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
MIZEX: A PROGRAM FOR MESOSCALE AIR-ICE-OCEAN INTERACTION EXPERIMENTS IN ARCTIC MARGINAL ICE ZONES. 2: A SCIENCE PLAN FOR A SUMMER MARGINAL ICE ZONE EXPERIMENT IN THE FRAM STRAIT/GREENLAND SEA: 1984
Ola M. Johannessen, William D. Hibler, III , Peter Wadhams, William J. Campbell, Klaus Hasselmann, Ira Dyer, and Max Dunbar May 1983 46 p
(AD-A134872; CRREL-SR-83-12) Avail: NTIS HC A03/MF A01 CSCL 08/12

A program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zone experiment in the fram Strait/Greenland Sea are discussed. Among the topics discussed are: the significance of the marginal ice zone; MIZ processes, models and scientific questions; Remote sensing; Strategy of the experiment; Collateral programs; acoustics and MIZEX; the biological program; and the MIZEX organization. GRA

N84-17738# Massachusetts Inst. of Tech., Cambridge. Dept. of Earth and Planetary Sciences.
DEVELOPMENT OF ULTRASONIC MODELING TECHNIQUES FOR THE STUDY OF CRUSTAL INHOMOGENEITIES Final Report, 1 Jun. 1981 - 30 Sep. 1982
M. Nafi Toksoz Aug. 1983 53 p
(Contract F19628-81-K-0039; AF Proj. 2309)
(AD-A134501; AFGL-TR-83-0070) Avail: NTIS HC A04/MF A01 CSCL 08/11

The character of surface wave scattering at local distances depends strongly upon surface topography and local crustal

structure. Ultrasonic methods were used to investigate the behavior of seismic waves propagating through scale models of topographic structures suspected of contributing to the scattering of seismic waves. Simple models, consisting of steps and rectangular-and triangular-shaped 'mountains' of varying dimension, were used in an empirical analysis of scattering of surface waves. Realistic seismograms were generated for a detailed scale model of the surface topography at Dry Valley Lake, Nevada. The addition of horizontal layers results in more complex seismograms, owing to dispersion and multiple reflections and conversions of the incident Rayleigh wave energy. Transmission of Rayleigh waves through the structure is improved with the addition of sedimentary layers. Finite difference methods were used to investigate the nature of the scattering produced by a scale rectangular 'mountain'. Upon encountering the 'mountain', the incident Rayleigh wave becomes severely distorted, and the 'mountain' re-radiates much of the incident energy in the form of body waves. GRA

N84-17739# Rice Univ., Houston, Tex.
REVIEW OF RADIO-FREQUENCY, NONLINEAR EFFECTS ON THE IONOSPHERE
William E. Gordon and Lewis M. Duncan 1983 13 p refs Presented at the 20th Congr. of the Inter. Assoc. of Hydraulic Res., Moscow, 19-24 Sep. 1983
(Contract W-7405-eng-36)
(DE84-003832; LA-UR-83-3368; CONF-830972-1) Avail: NTIS HC A02/MF A01

Modification of the ionosphere by high power radio waves in the megahertz band was investigated. The research has yielded advances in aeronomy, geophysics, and plasma physics with applications to radio communication. It is found that there is almost no linear effects of powerful radio waves on the ionosphere, and the nonlinear effects are emphasized. The important events up to the late 1960s are highlighted. Ohmic heating, parametric instabilities, self focusing and kilometer scale irregularities, meter scale irregularities, and a collection of recently discovered effects are outlined. It is concluded that stronger international cooperation would benefit this research, and a list of promising, difficult challenges is described. DOE

N84-17740# Texas A&M Univ., College Station. Center for Tectonophysics.
MECHANICAL AND TRANSPORT PROPERTIES OF ROCKS AT HIGH TEMPERATURES AND PRESSURES. TASK 3. MECHANICAL PROPERTIES OF ROCKS AT HIGH TEMPERATURES AND PRESSURES Technical Progress Report, 1 Mar. - 31 Oct. 1983
M. Friedman, J. Handin, and S. J. Bauer Nov. 1983 13 p refs (Contract DE-AS05-79ER-10361; Texas A&M Res. Proj. 4022D-03)
(DE84-003438; DOE/ER-10361/4; TPR-4) Avail: NTIS HC A02/MF A01

The preliminary conclusions about borehole stability in crystalline rocks at low confining pressures but high temperatures are presented. It is found that: (1) the creep rupture strength of granite is only about 20% below the short time triaxial compressive strength so that for geotechnical applications, the effect of time may be ignored; and (2) the frictional strength at least of smooth surfaces in granite is only about half of the intact strength, so that a jointed rock mass probably cannot be treated as a continuum and borehole failure by shear on those preexisting fractures with high resolved shear stresses may occur at considerably shallower depths than that predicted for unjointed rock. It is noted that in fracturing as a thermally activated process, the tensile strength of granite drops from anout 10 MPa at 250C to sensibly zero at 8000C. DOE

N84-17741# Research Inst. of National Defence, Umea (Sweden). Dept. 4.
A MODEL FOR SIMULATION OF A FLUCTUATING PLUME
Lennart Thaning May 1983 34 p refs In SWEDISH; ENGLISH summary
(FOA-C-40165-A1(C1); ISSN-0347-2124) Avail: NTIS HC A03/MF A01; Research Inst. Of National Defence, Stockholm KR 50

A model which describes the horizontal fluctuations in time and space of a plume in a qualitative way is presented. Mathematical functions for studying the frequency and amplitudes of the dispersion waves of the instantaneous plume with the distance from the release point are proposed. Amplitude increases and frequency decreases with distance. Mean and instantaneous concentrations in the plume are treated. Only horizontal fluctuations are considered, as the diffusion volume is limited vertically.
Author (ESA)

N84-17742# National Oceanic and Atmospheric Administration, Boulder, Colo. Air Resources Lab.
LIGHT SCATTERING CONDENSATION NUCLEI, AND AIR MASS TRAJECTORIES AT WHITEFACE MOUNTAIN: SUMMER 1982
Barry A. Bodhaine, John J. DeLuisi, Joyce M. Harris, and Raymond C. Costillo (State Univ. of New York) Aug. 1983 75 p refs
(PB84-104363; NOAA-DR-ERL-ARL-3; NOAA-83100602) Avail: NTIS HC A04/MF A01 CSCL 04A

An experiment to measure the effects of anthropogenic aerosols on clouds and solar radiation was conducted during the summers of 1981 and 1982 at Whiteface Mountain, N.Y. This report presents light-scattering and condensation nucleus data for the summer of 1982 in graphical and tabular form. In addition, 10-day back trajectories for which Whiteface Mountain is the destination are presented for the same time period. Author (GRA)

N84-17743# National Oceanic and Atmospheric Administration, Boulder, Colo. Air Resources Lab.
NIMBUS-7 SBUV (SOLAR BACKSCATTER ULTRAVIOLET) OBSERVATIONS OF SOLAR UV SPECTAL IRRADIANCE VARIATIONS CAUSED BY SOLAR ROTATION AND ACTIVE-REGION EVOLUTION FOR THE PERIOD NOVEMBER 7, 1978 - OCTOBER 26, 1979
Donald F. Heath, Richard F. Donnelly, and R. Gregg Merrill Aug. 1983 52 p refs
(PB84-108166; NOAA-TR-ERL-424-ARL-7; NOAA-83102001) Avail: NTIS HC A04/MF A01 CSCL 04A

Observations of temporal variations of the solar UV spectral irradiance over several days to a few weeks in the 160-400 nm wavelength range are presented in detail. The measurements were made by the Solar Backscatter Ultraviolet experiment on the NIMBUS-7 satellite during the period November 7, 1978, to October 26, 1979. The spectra of the variations in solar UV radiation caused by active-region evolution and solar rotation are presented for the 15 largest variations. To a first-order approximation, these 15 cases have essentially the same spectral shape and a small range in intensity. At wavelengths shorter than about 208 nm, the aluminum continuum enhancement dominates the spectra; at longer wavelengths, the magnesium continuum and lines dominate.
Author (GRA)

N84-17744# National Oceanic and Atmospheric Administration, Boulder, Colo.
HOMOGENEOUS MAGNITUDE SYSTEM OF THE EURASIAN CONTINENT: S AND L WAVES
L. Christoskov (Bulgarian Academy of Sciences, Sofia), N. V. Kondorskaya (Academy of Sciences (USSR), Moscow), and J. Vanek (Ceskoslovenska Akademie Ved, Prague) Jul. 1983 74 p refs
(PB84-101161; SE-34; NOAA-83092905) Avail: NTIS HC A04/MF A01 CSCL 08K

A research project was started by the Commission of Academies of Socialist Countries on Planetary Geophysics (KAPG) to establish a system of seismic reference stations of the Eurasian continent for determining reliable earthquake magnitudes. This system was called the Homogeneous Magnitude System (HMS), and seismologist of 13 institutions from Bulgaria, Czechoslovakia, German Democratic Republic, Poland, and the U.S.S.R. participated. The project was sponsored by the Commission on Practice of the International Association of Seismology and Physics of the Earth's Interior, which created a special working group for

homogeneous magnitude system within its Subcommission on Magnitude. GRA

N84-17745# National Oceanic and Atmospheric Administration, Boulder, Colo.
SUMMARY OF EARTHQUAKE INTENSITY FILE: A COMPUTERIZED FILE OF THE EFFECTS OF EARTHQUAKES IN THE UNITED STATES
Jerry L. Coffman and Carlos Angel 1983 29 p refs
(PB84-101443; KGRD-19; NOAA-83092904) Avail: NTIS HC A03/MF A01 CSCL 08K

In the early 1960s, preparing lists of historical earthquakes became less laborious and time consuming after the U.S. Coast and Geodetic Survey compiled a computerized data file of worldwide earthquakes. The file not only contained epicenters of earthquakes but also held other valuable information on each event, including the maximum reported intensity. The new file still had limitations, however, because the names of cities experiencing the earthquakes and the intensities at those cities were not included in the data base. The next logical step, therefore, was to compile another file--an Earthquake Intensity File--that not only would include instrumental earthquake data, but also would contain the important ancillary data on earthquake effects. This summary describes a computerized data file of this kind at the National Geophysical Data Center in Boulder, Colo. GRA

N84-17746# Chalmers Univ. of Technology, Goteborg (Sweden). Research Lab. of Electronics.
DUAL CHANNEL WATER VAPOR RADIOMETER SYSTEM
Gunnar Elgered and Per Lundh 1983 22 p refs
(PB84-119445; RR-145) Avail: NTIS HC A02/MF A01 CSCL 04A

A ground-based microwave radiometer which measures the atmospheric emission at the frequencies 21.0 and 31.4 GHz is described. It is a room temperature dual mixer receiver with two thermal reference loads in each channel. The reference loads can, depending on the application, be chosen to either 77 and 313 K, or 313 and 360 K. The radiometer is steerable in azimuth and elevation, with an angular resolution of 0.1 degree. The overall design is presented and the effect of extended antenna beams is discussed, as well as data acquisition, data reduction, and the accuracy of measured sky brightness temperatures. GRA

N84-17747# University of Southern California, Los Angeles. Dept. of Mechanical Engineering.
STRONG MOTION EFFECTS DUE TO SEISMIC WAVES IN DIPPING LAYERS
M. Dravinski Sep. 1983 216 p refs Submitted for publication (Grant NSF CEE-81-19696)
(PB84-127919; NSF/CEE-83214) Avail: NTIS HC A10/MF A01 CSCL 08K

The antiplane strain model for scattering of plane SH waves by dipping layers of arbitrary shape is investigated. The indirect boundary method is utilized and shown to provide very good results for a wide range of frequencies. Steady state wave motion for diffraction of plane P, SV, and Rayleigh waves by dipping layers of arbitrary shape is also studied. The use of an indirect boundary integral equation approach to examine amplification of motion caused by diffraction and scattering of a plane harmonic SH-wave by a layered medium in the Los Angeles basin is discussed. The effect of inclusion shape upon ground motion and ground motion amplification due to elastic inclusions in a half-space is also discussed. The amplification of P, SV, and Rayleigh waves by two alluvial valleys is addressed. GRA

N84-17748# National Environmental Satellite Service, Washington, D. C.
DETERMINATION OF THE PLANETARY RADIATION BUDGET FROM TIROS-N SATELLITES
Arnold Gruber, Irwin Ruff, and Charles Earnest Aug. 1983 17 p refs
(PB84-100916; NOAA/TR/NESDIS-3; NOAA-83092901) Avail: NTIS HC A02/MF A01 CSCL 04A

With the launching of the TIROS-N series of satellites, it was necessary to redesign the processing system that produces estimates of the planetary radiation budget. This report updates details of the processing of the pre-TIROS-N satellite data. The main difference between the two systems is that the current procedures operate directly on the incoming data stream where previously the processing was done on a mapped data base in which some processing of the raw data had already been accomplished. Other details concerning the orbital characteristics of the TIROS-N satellie system and the radiometers, as well as improved formulas for estimating flux quantities, are described. GRA

N84-17749# Geological Survey, Denver, Colo. Geophysics Branch.
PRINCIPAL FACTS FOR GRAVITY STATIONS IN THE NEVADA PORTION OF THE KINGMAN 1 DEGREE BY 2 DEGREE QUADRANGLE Final Report
Robert E. Bracken and Martin F. Kane 1983 44 p refs Prepared in cooperation with DOE, Washington
(PB84-103084; USGS-GD-83-009) Avail: NTIS HC A03/MF A01 CSCL 08E

The principal facts contained in the tables of this report document 862 gravity stations in the Nevada portion of the Kingman 1 degree x 2 degree quadrangle. Two data sets are documented: 193 stations by the USGS, and 669 from the Department of Defense gravity data file. The description of the USGS stations includes gravity meter used, base station locations and values, elevation sources and errors, data reduction methods, and Bouguer anomaly error analysis. Only principal facts are listed for the Department of Defense data. All stations have been terrain corrected. Author (GRA)

N84-17750# National Geodetic Survey, Rockville, Md. Charting and Geodetic Services.
SUBSIDENCE MONITORING FOR STATE OF ARIZONA
William E. Strange 1983 90 p refs
(PB84-126960; NOAA-83120107) Avail: NTIS HC A05/MF A01 CSCL 08E

This report proposes a plan for systematic monitoring of subsidence in Arizona. The objective is to provide a unified presentation of the requirements needed. The plan will facilitate a coordinated subsidence monitoring effort while making the most efficient use of available resources. The activities proposed in the plan would delineate areas of existing land subsidence and fissure development, expected locations and rates of future subsidence, and areas with the highest probability for developing additional earth cracks associated with subsidence. This will assist State agencies, city and county officials, architects, consulting engineers, developers, and local citizens in dealing with subsidence problems and minimizizng their impact on surrounding communities. GRA

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N84-17751# Meteorological Office, London (England).
BAROCLINIC INERTIAL INSTABILITY IN THE NON-STATIC EQUILIBRIUM ATMOSPHERE
Xu Qin and Zhou Xiao-ping 21 Nov. 1983 31 p refs Transl. into ENGLISH from Sci. Atmospherica Sinica (China), v. 6, no. 4, 1982 p 355-367 In ENGLISH and CHINESE
(BLL-Trans-1568-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The stability of two dimensional symmetric perturbations to a nonstatic stratified basic flow with vertical and horizontal shear is investigated. For a linear sheared basic flow the whole space initial value problem is solved from which the instability criterion and preferential growth direction are deduced. For the nonlinear sheared basic flow similar results are derived from the generalized

energy equation. The influence of viscosity and boundaries is analyzed and some inferences about mesoscale severe convection are discussed. S.L.

N84-17752# Meteorological Office, London (England).
ESTIMATION OF PARAMETERS OF SPRAY CLOUDS
Ye. P. Borisenkov, G. A. Zablotsky, A. P. Makshtas, A. I. Migulin, and V. V. Panov 19 Dec. 1983 10 p refs Transl. into ENGLISH from Arkt. Antarkt. Nauch.-Issled. Inst. Tr. (USSR), no. 317, 1975 p 121-126
(BLL-Trans-1571-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The structure of spray clouds formed over a water surface were studied. The spray which is torn by the wind from the crests of waves can have a substantial effect on the mechanism of the interaction between the sea and the atmosphere. The distribution of drops in a spray cloud over an open surface of water is studied. E.A.K.

N84-17753# Meteorological Office, London (England).
SOME PARAMETERS CHARACTERISING THE ICING OF SHIPS FROM SPRAY
A. V. Panyyshkin, V. V. Panov, and Z. I. Shvayshteyn [1983] 20 p refs Transl. into ENGLISH from Arkt. Antarkt. Nauch-Issled. Inst. Tr. (Leningrad), no. 317, 1975 p 33-44
(BLL-MO-Trans-1570-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The solution of thermophysical problems of ship icing is considered. The influence on capture efficiency of (1) the air velocity as wind-speed distribution close to the icing structure; (2) the trajectory of a drop, as a function of mass, the resistance of the medium to its motion, the size and shape of the structures, and the velocity of the air flow; and (3) the manner of interaction of the drop with the icing surface are discussed. N.W.

N84-17754 California Univ., Davis.
A THEORETICAL ANALYSIS OF THE PAST VARIATIONS IN GLOBAL ATMOSPHERIC COMPOSITION AND TEMPERATURE STRUCTURE Ph.D. Thesis
Donald James Wuebbles 1983 170 p
Avail: Univ. Microfilms Order No. DA8326114

A comprehensive analysis of how recognized anthropogenic and natural influences may have affected the atmosphere since the beginning of the industrial age is attempted. Within this context, model results for past and present atmosphere are compared with available observations of relevant atmospheric parameters. This report also examines whether recognized anthropogenic influences are sufficient to explain recent measured trends in atmospheric ozone and temperature. An attempt is made to evaluate the chemical composition and temperature structure of the atmosphere before major human influence, termed the pre-industrial atmosphere. A comparison is made between the calculated pre-industrial and present atmospheres to determine whether the ozone and temperature distributions might have been substantially different before human activities influenced the global atmosphere.
Dissert. Abstr.

N84-17755*# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
A LABORATORY INVESTIGATION OF THE REFLECTIVE PROPERTIES OF SIMULATED, OPTICALLY THICK CLOUDS Annual Report, 15 May 1980 - 15 May 1982
Thomas B. McKee and Stephen K. Cox 15 May 1982 15 p refs
(Grant NAG5-58)
(NASA-CR-175362; NAS 1.26:175362) Avail: NTIS HC A02/MF A01 CSCL 04B

The Cloud Field Optical Simulator project includes work in the following areas: (1) improvement in the shape of the desired (visible) spectral response of the measurement, (2) selection of two usable materials for cloud simulation, (3) a means of assigning a visible optical depth to the simulated clouds, and (4) confirmation that the apparatus is capable of detecting basic finite cloud characteristics. A brief description of the accomplishments in each of these areas is presented. S.L.

N84-17756*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
WIND SPEED AND DIRECTION SHEARS WITH ASSOCIATED VERTICAL MOTION DURING STRONG SURFACE WINDS
Margaret B. Alexander and Dennis W. Camp Feb. 1984 41 p refs
(NASA-TM-82566; NAS 1.15:82566) Avail: NTIS HC A03/MF A01 CSCL 04B

Strong surface winds recorded at the NASA 150-Meter Ground Winds Tower facility at Kennedy Space Center, Florida, are analyzed to present occurrences representative of wind shear and vertical motion known to be hazardous to the ascent and descent of conventional aircraft and the Space Shuttle. Graphical (percentage frequency distributions) and mathematical (maximum, mean, standard deviation) descriptions of wind speed and direction shears and associated updrafts and downdrafts are included as functions of six vertical layers and one horizontal distance for twenty 5-second intervals of parameters sampled simultaneously at the rate of ten per second during a period of high surface winds. Author

N84-17757# Science Applications, Inc., San Diego, Calif. Electronic Vision Systems Div.
SATELLITE MEASUREMENTS OF ATMOSPHERIC AEROSOLS Annual Report, 1 Dec. 1982 - 18 Nov. 1983
M. Griggs 23 Nov. 1983 34 p
(Contract N00014-77-C-0489)
(AD-A135241; SAI-83/1239) Avail: NTIS HC A03/MF A01 CSCL 04/2

Analysis of the Midway data set shows that the aerosol content determined with the two-channel technique is less accurate than with the one-channel method. An error analysis indicates that the main error sources affecting the use of the two-channel technique are the unknown atmospheric ozone and water vapor contents and the AVHRR sensor noise; if it is assumed that the ozone and water vapor contents would be known in operational use of the technique, then only the AVHRR sensor noise is of concern. Author (GRA)

N84-17758# Transportation Systems Center, Cambridge, Mass.
EVALUATION OF VISIBILITY SENSORS AT THE EGLIN AIR FORCE BASE CLIMATIC CHAMBER Final Report, Feb. - Dec. 1982
D. C. Burnham FAA Oct. 1983 200 p
(AD-A135375; DOT/TSC/FAA-83-1; FAA-PM-83-29) Avail: NTIS HC A09/MF A01 CSCL 04/2

Three transmissometers and five forward-scatter meters were evaluated for measuring fog, haze, rain, and snow in the large test chamber of the Eglin Air Force Base Climatic Laboratory. Methods were developed for generating moderately uniform and stable fog and haze conditions. Fog densities equivalent to Runway Visual Range (RVR) values of 100 to 600 feet were achieved; such fog densities are rare in nature and were the primary reason for undertaking the chamber tests. No unusual characteristics of the chamber fogs were noted. Laser transmissometers with 40- and 250 foot baselines served as standard sensors for the tests. Because of inhomogeneities in the chamber, only the 40-foot baseline gave good correlations with most of the test sensors. Consequently, one of the forward-scatter meters, the EG&G 207, was used as a secondary standard for high visibility (RVR above 1000 feet) conditions. With appropriate corrections, all the test sensors met the 15 percent root-mean-square error pass-fail criterion for measuring dense fog. Author (GRA)

N84-17759# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
KINETIC ENERGY IN THE NORTHERN HEMISPHERE DURING THE FGGE (FIRST GARP GLOBAL EXPERIMENT) YEAR M.S. Thesis - Wisconson Univ.
Jeffrey Harold Zautner 1983 78 p
(AD-A135382; AFIT/CI/NR-83-63T) Avail: NTIS

HC A05/MF A01 CSCL 04/2

Northern Hemisphere kinetic energy during the FGGE year is calculated on twice daily basis at 0000 GMT and 1200 GMT. Graphs of time series of total (K), zonal (K sub Z) and eddy (K sub E) kinetics energy exhibit a strong annual cycle with superimposed short term fluctuations of about 14 to 16 days in K and K sub E. This is confirmed by spectral analysis. Division of K sub E into standing and transient components by month shows good agreement with values from Peixoto and Oort (1974) for standing K sub E but poorer agreement for transient K sub E. A large portion of the difference is probably due to interpolation methods. Standing and transient K sub E by month and latitude show standing maxima associated with persistent trough and ridge features, mean jet stream and summer monsoon. A single transient maximum located about 5 to 10 deg north of the jet related standing maximum appears associated with cyclone activity. Geographical plots of grid point K showed Asian and North American east coast winter maxima near equal intensity. Lower than average North American temperatures enhanced baroclinicity, contributing to the stronger than average maximum. Spring reveals a collapsed North American maximum, and the signature of the Indian monsoon appears prominent in summer. Available potential energy (A) quantities from Min and Horn (1982) allow K to A ratios to be compared with those of Peixoto and Oort (1974). Author (GRA)

N84-17760# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
POSSIBLE TIDAL MODULATION OF THE INDIAN MONSOON ONSET Ph.D. Thesis
W. H. Campbell May 1983 155 p
(AD-A135441; AFIT/CI/NR-83-60D) Avail: NTIS HC A08/MF A01 CSCL 04/2

The a priori hypothesis that soli-lunar atmospheric tides can induce an element of the variability in mean monthly climatic data is tested using precipitation (1985-1960), station pressure (1895-1960) and 300 mb height data (1950-1977) for India during the monsoon onset month of June. Since the monsoon onset occurs, on average, very late in the month in northern India, this region is very sensitive to small departures from normal in the onset date. These departures can be seen in the year to year fluctuations of June rainfall amounts. To test the hypothesis involving lunar atmospheric tides, a time series of mean monthly lunar tidal potential for June (1985-1960) was calculated. The results of this research showed that there is an important periodic component (on the order of one standard deviation during hemispherically cold periods) in the interannual variability of pressure, precipitation, and upper air winds for the Indian monsoon onset month of June at the two dominant lunar frequencies and that the atmospheric response is in phase with the forcing. This strongly suggests that lunar atmospheric tides to produce an element of the observed interannual variability. GRA

N84-17761# Air Force Global Weather Central, Offutt AFB, Nebraska.
CLOUD FORECAST FIELDS COMPARISON TEST
K. E. Mitchell May 1982 68 p
(AD-A135556; AD-E850383; AFGWC/TN-82/003) Avail: NTIS HC A04/MF A01 CSCL 04/2

This technical note reports a study of the comparative cloud forecast skill of several numerical analysis/forecast systems at the Air Force Global Weather Central (AFGWC) and the National Meteorological Center (NMC). The study compared gridded cloud forecasts derived from AFGWC's trajectory cloud forecast model (5LAYER) and NMC's 7-Layer moist primitive equation model (7LHFM) during the period August to September 1979. The study also measured the sensitivity of the 5LAYER model to the accuracy of input forecast winds (used to compute trajectories). The results show that 5LAYER and 7LHFM-derived cloud forecasts differ appreciably owing to fundamental differences in the methods used by the two centers to initialize their respective model moisture fields. During the first 24-hour forecast period, 5LAYER consistently produces more accurate cloud forecasts than the 7LHFM, because satellite and surface cloud observations are used systematically and globally in the derivation of 5LAYER initial moisture fields. GRA

N84-17762# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
SYNOPTIC METEOROLOGY DURING THE SNOW-ONE-A FIELD EXPERIMENT
M. A. Bilello May 1983 86 p
(DA Proj. 4A7-62730-AT-42)
(AD-A134888; CRREL-SR-83-10) Avail: NTIS HC A05/MF A01 CSCL 04/2

The daily atmospheric systems and weather fronts that traversed the northeastern United States during the SNOW-ONE-A Field Experiment from 30 November to 20 December 1981 and from 3 January to 10 February 1982 are summarized. This experiment is the second of a series of winter measurements of the influence of atmospheric obscurants on electro-optical system performance. The analysis of the large-scale synoptic weather patterns that developed during the field test period constitutes a critical component of the research program. Precipitation in northern Vermont during SNOW-ONE-A was near normal for the region. Numerous separate snowfall events, including some with substantial amounts of snow, were recorded during the experiment period. Almost all of the storm that produced more than 6 cm of snow resulted from coastal cyclogenesis or developing waves that deepened as they moved north or northeastward along the Atlantic coastline. The majority of the other events with lighter amounts of freezing precipitation were caused by less intense storm systems, troughs, or fronts that traversed the region from the west or northwest and often moved quite rapidly. Author (GRA)

N84-17763# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abt. Wolkenphysik.
STATUS FOR KNOWLEDGE: METEOROLOGICAL AFFECTED ICING ON AIRCRAFT IN CLOUDS
Hans-Ebernard Hoffmann Jun. 1983 66 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-83-12) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 20,50

The international status of knowledge is presented. Besides a series of special reports the following reports are used as a basis: The Federal Aviation Regulations (FAR) today valid - respectively reports from 1949-1956, on which they are founded - and publications of AGARD and German Military Geophysical Office in the last time. The presentation of status of knowledge is arranged according to the following topics: cloudphysical parameters (temperature, liquid water content, particle size), cloud parameters (class of clouds, range, altitude, orograhy), synoptics (fronts, air masses), calculation of the ice accretion and the derivation of empirical equations and diagrams for the changing of the aerodynamic coefficients. ESA

N84-17764# World Meteorological Organization, Geneva (Switzerland).
GUIDE TO METEOROLOGICAL INSTRUMENTS AND METHODS OF OBSERVATION
1983 495 p refs Revised
(WMO-8; ISBN-92-63-15008-4) Avail: NTIS MF A01; print copy available from WMO, Geneva SWFR 38

Guidelines for measuring atmospheric pressure, temperature, humidity, wind, precipitation, evaporation, radiation, visibility, and cloud parameters are presented. Radiosonde, balloon, aircraft, and rocket sounding techniques are described. Location of atmospherics sources, marine observation, lower troposphere sounding, and measurement of sunshine duration and soil moisture are covered. Equipment specifications for aeronautical and automatic weather stations are given. Quality control of observing practices and procedures is discussed. Author (ESA)

N84-17765# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
SCATTEROMETER SYSTEM SIMULATOR (SSS), PHASE 1:

DEFINITION Final Report
H. Groebke, P. Hans, D. Miller, and R. Siol Paris ESA May 1983 181 p refs
(Contract ESTEC-5176/82/NL-PP)
(ESA-CR(P)-1788) Avail: NTIS HC A09/MF A01

An analytic simulation approach and modeling strategies for the ERS-1 wind scatterometer are proposed. The expected instantaneous power spectra at the antenna are generated and then translated through the receiver and processed. The critical algorithms are formulated and user definition of system scenario, including wind field, are explained. This avoids the unacceptably long run times of Monte Carlo simulation and allows the necessary receiver modeling in the frequency domain and processing in the time domain. It arrives at radar cross-section values for a user defined measurement grid. Measurement uncertainties are represented by a variance calculated by the simulator for the major components of random error. A simulator facility allows other contributions to be estimated. The mathematical basis of the modeling is presented. Simulator use and the implications for its computer implementation are identified. Author (ESA)

N84-17766# National Weather Service, Silver Spring, Md.
PERTINENT METEOROLOGICAL DATA FOR HURRICANE ALLEN OF 1980
Francis P. Ho and John F. Miller Sep. 1983 83 p refs
(PB84-104322; NOAA/TR/NWS-35) Avail: NTIS HC A05/MF A01 CSCL 04B

All available meteorological data for Hurricane Allen, 1980, have been analyzed in the report to provide information as accurate as possible for use in dynamic storm surge models. Detailed analyses are presented of the storm track, forward speed, central pressure, and radius to maximum wind. Particular attention is given to the period surrounding landfall. GRA

N84-17767# Clemson Univ., S.C. Water Resources Research Inst.
USE OF DIGITIZED RADAR AND MICROCOMPUTERS TO FORECAST LOCAL FLOODS AND IRRIGATION NEEDS Final Technical Report, Jan. 1982 - Mar. 1983
Soronadi Nnaji, Dale F. Linvill, and Kevin D. Robbins Jun. 1983 89 p refs
(Contract DI-14-34-0001-2143)
(PB84-105568; WRRI-113; W83-04158; OWRT-A-054-SC(1)) Avail: NTIS HC A05/MF A01 CSCL 04B

The objective is to develop an inexpensive microcomputer based system for making weather sensitive decisions in real time. The focus is toward the small scale weather information user. To this end the report describes a Radar Information Management System which uses a microcomputer to access, reformat, localize, store and retrieve radar rainfall (or other weather) data in digitized form. In addition to the system software, interactive applications software have been developed that will allow use of the system for local flood forecasting and assessment of irrigation needs given soil moisture predictions on real time radar rainfall. Author (GRA)

N84-17768# National Academy of Sciences - National Research Council, Washington, D. C. Steering Committee for Ocean/Climate Research Strategies.
OCEAN RESEARCH FOR UNDERSTANDING CLIMATIC VARIATIONS: PRIORITIES AND GOALS FOR THE 1980'S Final Report
5 Aug. 1983 67 p refs Sponsored in part by the NSF
(Contract NA80SA-C-00830)
(PB84-105816) Avail: NTIS HC A04/MF A01 CSCL 04B

Ocean research programs related to climatic variation are reviewed and the scientific issues to be addressed including techniques, technology, and data management with recommendations are outlined. However, major goals, many of the required elements, and some priorities are identified. GRA

N84-17769# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Coastal Flooding from Hurricanes.
EVALUATION OF THE FEMA (FEDERAL EMERGENCY MANAGEMENT AGENCY) MODEL FOR ESTIMATING POTENTIAL COASTAL FLOODING FROM HURRICANES AND ITS APPLICATION TO LEE COUNTY, FLORIDA Final Report
Aug. 1983 162 p refs
(PB84-105832) Avail: NTIS HC A08/MF A01 CSCL 04B

The hurricane storm surge and the flooding it produces are described. The numerical (computer) model developed for use in mapping coastal flood hazard areas for the National Flood Insurance Program, and the application of that model to Lee County are also described. Detailed examination of the model's component parts--the storm model, the hydrodynamic model, and the probability procedure--reveals deficiencies in the methodology and the way in which it was applied to Lee County. Recommendations are offered for remedying these deficiencies. GRA

N84-17770# Wyoming Univ., Laramie. Dept. of Atmospheric Science.
CLOUD PHYSICS INVESTIGATIONS BY THE UNIVERSITY OF WYOMING IN HIPLEX 1977-1982 Final Report, Apr. 1977 - Apr. 1982
William A. Cooper, R. Paul Lawson, Alfred R. Rodi, and Todd A. Cerni Nov. 1982 135 p refs
(Contract DI-7-07-83-V0001)
(PB84-106756; AS-142) Avail: NTIS HC A07/MF A01 CSCL 04B

The characteristics of the CuCg clouds are summarized, and the nature of the clouds studied are described. Entrainment provided the primary competition to seeding in the HIPLEX-1 clouds. The liquid water contents decayed rapidly, generally with a time constant of about 14 min., and this rapid decay inhibited growth of the added ice crystals to graupel. The speed with which entrainment erodes small CuCg accounts for their natural low precipitation efficiency, but also prevents exploitation of that efficiency through seeding in most cases. GRA

N84-17771# National Oceanic and Atmospheric Administration, Washington, D. C.
MARINERS WEATHER LOG, VOLUME 27, NUMBER 3, SUMMER 1983
Sep. 1983 69 p
(PB84-108356; NOAA-83101901) Avail: NTIS HC A04/MF A01 CSCL 04B

Contents: Gulf Stream variability and width; Great Lakes navigation season, 1982; cyclone in the Mediterranean, January 1982; marine observations program; tips to the radio office; marine weather review of the North Atlantic and North Pacific Oceans. GRA

N84-17772# National Environmental Satellite Service, Washington, D. C.
A STATISTICAL TECHNIQUE FOR FORECASTING SEVERE WEATHER FROM VERTICAL SOUNDINGS BY SATELLITE AND RADIOSONDE
D. L. Keller and W. L. Smith Jun. 1983 42 p refs
(PB84-114099; NOAA/TR/NESDIS-5; NOAA-83102701) Avail: NTIS HC A03/MF A01 CSCL 04B

An objective non-linear forecast technique is developed. Its value for severe weather forecasting using high spatial density NOAA-6 polar orbiting satellite soundings is compared with the forecasing skill achieved with radiosonde data. Gridpoint analyses of tropospheric temperatures, dewpoints, and winds are used to calculate stability and dynamic predictors. A non-linear graphical regression technique is used to evaluate the predictors individually and in combination, with the data being divided into 21 dependent and ten independent days (or cases) obtained during the 1981 severe weather season. Using the NOAA-6 polar orbiting satellite derived severe weather probability equations, a case study is done using geosynchronous satellite VAS sounding data, demonstrating its capability of monitoring severe weather potential throughout the day. Author (GRA)

N84-17773# Wisconsin Univ., Madison. Space Science and Engineering Center.
ENHANCEMENT OF SEASAT WIND-STRESS MEASUREMENTS USING DATA FROM GOES Final Report, 1 Oct. 1978 - 31 Dec. 1981
V. E. Suomi, B. B. Hinton, and D. P. Wylie Aug. 1983 72 p refs (Contract MO-A01-78-00-4331)
(PB84-111244; NOAA-83102503) Avail: NTIS HC A04/MF A01 CSCL 04B

This report summarizes work done at the Space Science and Engineering Center from 1 October 1978 to 30 December 1981 to study the relationships of low level cloud motions to near surface winds over the oceans, and in particular the near surface winds measured by the active microwave scatterometer on SEASAT-A. This report largely discusses comparisons of data, and simple methods of handling the data. Specifically, this report discussed the relationship of winds at cloud level with mast level winds as observed by island-based radiosonde stations, cloud motions, sun glint, and ships as well as SEASAT. GRA

N84-17774# National Oceanic and Atmospheric Administration, Rockville, Md. Air Resources Lab.
PREPARING METEOROLOGICAL DATA FOR USE IN ROUTINE DISPERSION CALCULATIONS: WORKGROUP SUMMARY
John S. Irwin Aug. 1983 27 p refs
(PB84-119890; NOAA-TM-ERL-ARL-122; NOAA-83110801) Avail: NTIS HC A03/MF A01 CSCL 04B

The conclusions of a discussion workgroup are presented outlining methods for preparing meteorological data for routine use in air quality simulation of dispersion. The goal of the workgroup was to initially accommodate Gaussian plume modeling techniques, and to expand the meteorological variable list, as needed in the future, to accommodate other dispersion estimation techniques. Methods are suggested for estimating the vertical profiles of wind velocity, temperature, and the variances of the vertical and lateral wind speed fluctuations. Author (GRA)

N84-17775# National Weather Service, Garden City, N.Y. Forecast Office.
TERR, PERR, AND GIGC: THREE PROGRAMS TO COMPUTE VERIFICATION STATISTICS
Matthew R. Peroutka Aug. 1983 45 p refs
(PB84-127521; NOAA-NWS-ERCP-12; NOAA-83113001) Avail: NTIS HC A03/MF A01 CSCL 04B

This paper describes three programs which are available to analyze the verification data which can be stored at any WSFO using the national verification programs. TERR will compute mean absolute temperature errors for three forecast periods at up to three stations with summary statistics. PERR will compute Brier scores for three forecast periods at up to three stations with similar statistics. BIGC will analyze situations where an arbitrary change in temperature was either forecast or observed. All three programs are written in Data General FORTRAN IV, and execute in the background partition of a WSFO system. GRA

N84-17776# National Weather Service, Kansas City, Mo. Central Region.
METEOROLOGICAL APPLICATIONS LIBRARY (CRH.LB)
Thomas F. Schwein Nov. 1983 60 p
(PB84-122639; NOAA-NWS-CRCP-11; NOAA-83111405) Avail: NTIS HC A05/MF A01 CSCL 09B

The Meteorological Applications Library is a set of subroutines that perform tasks in four distinct areas. These are as follows; Meteorological calculations; database manipulation; mathematical calculations; and application program utilities. GRA

N84-17777# National Weather Service, Silver Spring, Md. Office of Hydrology.
PROBABLE MAXIMUM PRECIPITATION AND SNOWMELT CRITERIA FOR SOUTHEAST ALASKA
F. K. Schwartz and J. F. Miller Sep. 1983 127 p refs Sponsored in part by the Corps of Engineers
(PB84-104371; NOAA-NWS-HR-54) Avail: NTIS HC A07/MF A01 CSCL 04B

Probable maximum precipitation (PMP) estimates for durations between 6 and 72 hours for area sizes between 10 and 400 sq mi for any location in Southeast Alaska (except for the extreme northwest section) are given. In addition to all-season PMP, estimates are provided for the spring and early summer snow melt season. Generalized estimates of snowpack and other snowmelt criteria including temperaures, dew points, and winds are also provided. GRA

N84-17778# National Center for Atmospheric Research, Boulder, Colo.
EFFECT OF DIABATIC AND FRICTIONAL PROCESSES ON FRONTAL CIRCULATIONS M.S. Thesis - Pennsylvania State Univ.
Daniel Baldwin 1983 98 p refs Sponsored by the National Science Foundation
(PB84-104074; NCAR/CT-76) Avail: NTIS HC A05/MF A01 CSCL 04B

A cross sectional numerical model is used to investigate the effects of latent heating and boundary layer processes on the circulations associated with a cold front. A comparison between a moist and dry simulation is used to elucidate the effects of moisture on the large scale circulation. The diagnostic Eliassen equation is used to partition the forcing responsible for the generation of the ageostrophic secondary circulation. The processes that produce this circulation are a large-scale shearing deformation, vertical exchange of heat and momentum, and latent heat release. Three major differences were observed in the comparison of the moist and dry simulations. GRA

N84-17779# National Center for Atmospheric Research, Boulder, Colo.
FRONTOGENESIS IN A MOIST ATMOSPHERE Ph.D. Thesis - Pennsylvania State Univ.
Eirh-Yu Hsie 1983 284 p refs Sponsored by the National Science Foundation
(PB84-104066; NCAR/CT-75) Avail: NTIS HC A13/MF A01 CSCL 04B

The effects of condensation and evaporation on mesoscale frontal circulations in a two dimensional numerical model were investigated. Utilizing an explicit prediction scheme for the prediction of water vapor, cloud water, and rainwater, the model is used to investigate the interactions between convection and the large scale environment. The model results are qualitatively compared with recent observations from the Severe Environmental Storms and Mesoscale Experiment-Atmospheric Variability Experiment experiment. GRA

N84-17780# National Oceanic and Atmospheric Administration, Princeton, N.J. Geophysical Fluid Dynamics Lab.
FGGE LEVEL 3-B DAILY GLOBAL ANALYSES. PART 2: (MAR. 1979 - MAY 1979)
J. J. Ploshay, R. K. White, and K. Miyakoda Jul. 1983 293 p refs
(PB84-100270; NOAA-DL-ERL-GFDL-2; NOAA-83092907) Avail: NTIS HC A13/MF A01 CSCL 04B

Daily global analyses of the FGGE Level III-b data set is included. The FGGE observes comprehensively and accurately the atmospheric state and circulation on a global scale, and increases understanding of the dynamics of the equatorial atmosphere and ocean to ultimately improve weather and climate prediction. Four levels of polar sterographic maps of the Northern and Southern Hemispheres (geopotential height at 500 mb, 300 mb, 500 mb, and sea level pressure), as well as two levels (200 mb and 850 mb) of tropical streamlines and isotachs, are presented. GRA

N84-17781# National Environmental Satellite Service, Washington, D. C.
NOAA (NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION) SATELLITE PROGRAMS BRIEFING
Aug. 1983 209 p

(PB84-108349; NOAA-83101903) Avail: NTIS HC A10/MF A01 CSCL 04B

There are two types of civil operational remote sensing satellites in use today, polar orbiting and geostationary. Two U.S. polar orbiting weather satellites monitor weather and surface conditions over the entire globe. Two U.S. geostationary weather satellites observe, respectively, the Atlantic Ocean and East and Gulf Coasts and the Pacific Ocean and West Coast. A single U.S. Earth resources satellite, called LANDSAT, is also in polar orbit. These United States systems are complemented by a number of foreign Earth observing satellites, and more foreign satellites will be launched in the latter half of the 1980's. GRA

N84-17782# Electronic Techniques, Inc., Fort Collins, Colo.
SCPP (SIERRA COOPERATIVE PILOT PROJECT) FORECASTING SUPPORT, VOLUME 1 Interim Progress Report, 1 Jul. 1982 - 31 Aug. 1983
A. W. Huggins, J. O. Rhea, J. L. LeCompte, G. L. Hemmer, A. P. Kuciauskas, and C. J. Wilcox Sep. 1983 221 p refs
(Contract DI-9-07-85-V0021)
(PB84-107911) Avail: NTIS HC A10/MF A01 CSCL 04B

Field services and analyses for the Sierra Cooperative Pilot Project (SCPP), a cloud seeding project, from 1 July 1982-31 August 1983 are discussed. A description of field services, analyses conducted, the 1982-83 PET catalog, and forecast verification are given. Field services included forecasting, rawinsonde observations, radar operation, and coordination of airborne experiments. Data documentation, reduction, and information storage was also part of the work. Author (GRA)

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N84-17783# Council for Scientific and Industrial Research, Pretoria (South Africa).
PROCEEDINGS OF THE 18TH INTERNATIONAL CONFERENCE ON COASTAL ENGINEERING
[1983] 468 p refs Proc. held in Cape Town, 14-19 Nov. 1982
(ISBN-0-7988-2553-7) Avail: NTIS HC A20/MF A01

Abstracts of 225 papers are arranged sequentially according to the conference program. Factors involved in coastal engineering covered include: wind, current and wave action; tides and long waves; sedimentary processes and coastal morphology; estuary and inlet behavior; coastal structures and recreational facilities; ship motion as related to harbor design; ocean outfall design and construction; and environmental aspects in coastal engineering design. Author and subject indexes are provided. A.R.H.

N84-17784*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLIGHT MEASUREMENT AND ANALYSIS OF AAFE RADSCAT WIND SPEED SIGNATURE OF THE OCEAN
Lyle C. Schroeder, W. Linwood Jones (Satellite Television Corp.), Philip R. Schaffner (Research Triangle Inst.), and John L. Mitchell (Kentron International, Inc.) Jan. 1984 148 p refs
(NASA-TM-85646; L-15651; NAS 1.15:85646) Avail: NTIS HC A07/MF A01 CSCL 08J

The advanced aerospace flight experiment radiometer scatterometer (AAFE RADSCAT) which was developed as a research tool to evaluate the use of microwave frequency remote sensors to provide wind speed information at the ocean surface is discussed. The AAFE RADSCAT helped establish the feasibility of the satellite scatterometer for measuring both wind speed and direction. The most important function of the AAFE RADSCAT was to provide a data base of ocean normalized radar cross section (NRCS) measurements as a function of surface wind vector at 13.9 GHz. The NRCS measurements over a wide parametric range of incidence angles, azimuth angles, and winds were obtained in a series of RADSCAT aircraft missions. The obtained data base was used to model the relationship between k sub u band radar signature and ocean surface wind vector. The models developed therefrom are compared with those used for inversion of the SEASAT-A satellite scatterometer (SASS) radar measurements to wind speeds. E.A.K.

N84-17785# Delft Hydraulics Lab. (Netherlands).
WEST BREAKWATER, SINES (PORTUGAL)
Aug. 1983 56 p refs Proc. of ASCE Specialty Conf. on the Design and Performance of Coastal Struct., Arlington, Va., 9-11 Mar. 1983
Avail: NTIS HC A04/MF A01

Rehabilitation of a harbor breakwater following extensive storm damage was discussed. Wave climatology and armor stability were investigated. For individual titles, see N84-17786 through N84-17789.

N84-17786# Delft Hydraulics Lab. (Netherlands). Maritime Structures Branch.
WEST BREAKWATER-SINES (PORTUGAL). OVERVIEW OF REHABILITATION AND SYNTHESIS OF PROJECT
J. F. Toppler (PRC Harris International, The Hague), A. Steenmeyer (PRC Harris International, The Hague), M. A. GoncalvesdaSilva (Gabinete da Area de Sines, Lisbon), H. Ligteringen, and F. SilveiraRamos (Consulmar, Lisbon) *In its* West Breakwater, Sines (Portugal) Aug. 1983 p 3-16 refs (For primary document see N84-17785 08-48)
Avail: NTIS HC A04/MF A01

Harbor breakwater emergency protection, the dolos transition section and the outer portion were investigated in order to repair extensive storm damage. Wave climate studies; geotechnical investigations; two and three dimensional hydraulic stability analysis and testing; the effects of nonrehabilitation; wave penetration; and ship motion studies are summarized. Author (ESA)

N84-17787# Delft Hydraulics Lab. (Netherlands).
WEST BREAKWATER-SINES (PORTUGAL): WAVE CLIMATOLOGY
Arthur E. Mynett, Willem J. P. deVoogt, and Edward J. Schmeltz (PRC Harris, Inc., New York) *In its* West Breakwater, Sines (Portugal) Aug. 1983 p 17-30 refs (For primary document see N84-17785 08-48)
Avail: NTIS HC A04/MF A01

The deep water wave climate offshore Sines is derived from a numerical hindcast study, simulating twenty major storms over a 25 year period. Nearshore effects of refraction and shoaling are investigated using mathematical computations and hydraulic model studies, emphasizing irregular waves. Details on spectral shapes and wave grouping are derived from prototype measurements. Design storm considerations are presented. Author (ESA)

N84-17788# Delft Hydraulics Lab. (Netherlands). Maritime Structures Branch.
WEST BREAKWATER-SINES (PORTUGAL): STUDY OF ARMOR STABILITY
A. Mol, H. Ligteringen, R. L. Groeneveld (PRC Harris International, The Hague), and C. R. A. M. Pita (Lab. Nacional de Engenharia Civil, Lisbon) *In its* West Breakwater, Sines (Portugal) Aug. 1983 p 57-70 refs (For primary document see N84-17785 08-48)
Avail: NTIS HC A04/MF A01

Armor stability of a harbor breakwater was investigated, following emergency repairs after storm damage. Modification of the repairs at the dolos section consisting of a submerged breakwater, and to a proposed reconstruction of the severely damaged outer part at the seaward side by a slope of 1:4 are proposed. Tide influence is noted in shallow water in the outer part. Wave groupedness does not significantly influence the stability, but the peak period is an important stability parameter. Tests on the effect of broken and rounded cubes on stability show a considerable decrease in stability of the armor layer. The total risk of failure of an armor layer was established taking into account the statistical properties of the wave height and peak period and by assuming an aging effect on the overall stability. A

large influence of the assumptions regarding the statistics of the peak period and the aging effect on the return period of a certain damage is found. Author (ESA)

N84-17789# Delft Hydraulics Lab. (Netherlands).
WEST BREAKWATER-SINES (PORTUGAL): NEW ASPECTS OF ARMOR UNITS
R. L. Groeneveld (PRC Harris International, The Hague), A. Mol, and P. A. J. Zwetsloot (PRC Harris International, The Hague) *In its* West Breakwater, Sines (Portugal) Aug. 1983 p 45-56. refs (For primary document see N84-17785 08-48)
Avail: NTIS HC A04/MF A01

The structural strengths of dolos, tetrapods and cubes were compared in static and dynamic loading tests. Rocking motions and accelerations were studied in a 2-D hydraulic model of a harbor breakwater. These are compared with the structural strength of the units. Effects of interlocking and nesting of units are considered. Static tests show that when applying dolos above a weight on the order of 15t and tetrapods above a weight on the order of 30t, hardly any residual strength is available to resist dynamic loading due to wave forces and settlements. For dynamic loads cubes resist considerably higher impact loads than dolos and tetrapods. Hydraulic model tests on cubes show that 10% of the units have impact velocities > 2 m/sec and 1% > 3 m/sec. Ro-block (trademark) cubes are recommended when nesting is required. Author (ESA)

N84-17790# Texas Univ., Austin. Inst. for Geophysics.
WAVE PROPAGATION STUDY OF THE CENTRAL MEDITERRANEAN SEA USING OCEAN BOTTOM SEISMOMETERS
William P. OBrien, Jr. and Subir Chatterjee 1 Nov. 1983 80 p (Contract N00014-77-C-0606)
(AD-A135484; UT-GC-575) Avail: NTIS HC A05/MF A01 CSCL 08/11

Ocean bottom seismometers (OBS) were deployed in the Mediterranean for two refraction surveys shot with underwater sound signal (SUS) charges. The digital data were analyzed to determine: (1) the attenuation features, signal/noise (S/N) characteristics and frequency content of water waves and body waves; and (2) the crustal structure of the test areas. The attenuation of water-wave signals was fairly uniform within the passband of the OBS (10-31 HZ) and was greater in deep water than in shallower water, and body waves were much more strongly attenuated than water waves. The S/N ratios were much larger for the SUS shots detonated at 91 m depth than for those detonated at 244 m depth. The body-wave data indicated the presence of a layer with P-wave velocity of 3.8 km/sec about 0.8 km below mean sea level in one test area. Probably this is a Miocene evaporite sequence. Author (GRA)

N84-17791# Coastal Engineering Research Center, Vicksburg, Miss.
NEARSHORE CURRENT MODEL WORKSHOP SUMMARY Final Report
J. M. Hubertz Sep. 1983 60 p
(AD-A134702; CERC-83-3) Avail: NTIS HC A04/MF A01 CSCL 08/3

A program to improve and validate nearshore circulation models was begun in 1980 at the Coastal Engineering Research Center (CERC), then at Fort Belvoir, Va. The program's major objective was to develop the capability to predict currents and sediment transport in and near the surf zone. One of the first goals of the program, to produce a state-of-the-knowledge review and an annotated bibliography, was accomplished upon publication of CERC reports MR 82-7(I) and MR 82-7(II). A second goal, to use these reports as a basis for discussing (1) needed improvements in modeling nearshore currents and (2) future directions of research, was accomplished by means of a workshop held on 9-10 June 1982. Experts working in the field were invited to make formal presentations of current model studies and to participate in discussions to define improvements needed in (1) nearshore current theory, (2) nearshore current modeling, and (3) theory verification, i.e, instrumentation, measurements, and experiment design. This report contains a general description of the workshop, a summary of the three working sessions, and author-provided abstracts of the formal presentations. Author (GRA)

N84-17792# Army Engineer Waterways Experiment Station, Livermore, Calif.
METHODOLOGY FOR THE CALCULATION OF A SHALLOW-WATER WAVE CLIMATE Final Report
R. E. Jensen Sep. 1983 83 p
(AD-A134715; AD-E301247; WES-8) Avail: NTIS HC A05/MF A01 CSCL 08/3

This report describes the methodology employed to generate 20 years of wave conditions in 10-m water depths as part of the Wave Information Study. Descriptive techniques (time series plots, cross plots, and percent occurrence plots) are employed to compare recorded and computed wave heights and periods at six locations along the Atlantic coast. Author (GRA)

N84-17793# Coast Guard, Washington, D.C.
REPORT OF THE INTERNATIONAL ICE PATROL SERVICE IN THE NORTH ATLANTIC OCEAN, SEASON OF 1981
29 Jul. 1983 47 p
(AD-A134791; AD-E301231; USCG-BULL-67; USCG-188-36) Avail: NTIS HC A03/MF A01 CSCL 08/12

This is the 67th in a series of annual reports on the International Ice Patrol Service in the North Atlantic. The U.S. Coast Guard conducted the 1981 International Ice Patrol service to observe the southeastern, southern, and southwestern limits of icebergs in the vicinity of the Grand Banks of Newfoundland to inform international mariners of the extent of the iceberg hazard. The 1981 International Ice Patrol season was relatively short with fewer than average icebergs drifting south of 48 deg N latitude. The ice sightings and sea surface temperature reports received were useful in the preparation of the daily ice bulletin and facsimile chart.GRA

N84-17794# Naval Research Lab., Washington, D. C. Environmental Sciences Div.
SEA SALT AEROSOL, ATMOSPHERIC RADON AND METEOROLOGICAL OBSERVATIONS IN THE WESTERN SOUTH ATLANTIC OCEAN (FEBRUARY 1981) Interim Report
F. K. Lepple, D. J. Bressan, J. P. Hoover, and R. E. Larson 28 Sep. 1983 70 p
(AD-A134792; AD-E301231; NRL-MR-5153) Avail: NTIS HC A04/MF A01 CSCL 08/10

The concentration of sea salt aerosol was measured aboard the USNS HAYES at 16m height in the western South Atlantic Ocean from February 3-19, 1981. Aerosol samples were collected using a NRL-designed, automated sampler coupled to a programmable environmental monitoring system. Simultaneous measurements of wind speed and direction, air and water temperature, relative humidity, barometric pressure and atmospheric radon concentration were also made nearly continuously along the cruise track. Emphasis on functional relationships between synoptic measurements of sea salt aerosol and local wind speed showed the overall correlation between these two parameters to be poor (r approx 0.3 for 249 data point sets), However, when the data is separated into discrete meteorological and/or oceanographic events, most short term correlations are significantly improved. In this region of the South Atlantic Ocean, we attribute the low overall correlation between synoptic measurements of salt aerosol and wind speed to the effects of hysteresis, condensation processes and varying structure of the turbulent boundary layer. The sea surface temperature varied widely during this cruise and seemed to directly influence the atmospheric salt load, regardless of wind speed in many cases. Deterministic predictions of instantaneous sea salt aerosol values will require improved real-time methods for characterizing the marine boundary layer. Alternatively, modelling sea salt aerosol concentrations might be most practically effected using a statistical approach. GRA

N84-17795# Naval Postgraduate School, Monterey, Calif.
A DETERMINATION OF THE CONSTANTS FOR A SECOND-ORDER CLOSURE TURBULENCE MODEL FROM GEOPHYSI-

CAL DATA
P. C. Gallacher, A. A. Bird, R. W. Garwood, Jr., and R. L. Elsberry Sep. 1983 41 p
(AD-A134826; NPS63-83-004) Avail: NTIS HC A03/MF A01 CSCL 08/10

Values of four parameterization constants for the bulk, second-order closure turbulence model of Garwood (1976) are determined using ocean data from the North Pacific experiment (NORPAX) Trans-Pacific ship of opportunity program (TRANSPAC) and atmospheric forcing from the Fleet Numerical Oceanography Center (FNOC) model. The annual cycle of sea surface temperature is simulated for each of the years 1976-1978. The difference between the simulated and the analyzed monthly change of sea surface temperature is minimized to determine the optimal values of the model constants. Three statistical techniques are used to determine the sensitivity of the model to changes of the model constants. Two techniques, bootstrapping and pooled permutation procedure, yield similar conclusions. The third, a standard students' t-test, proved to be overly sensitive. The formulation for the absorption of solar radiation with depth, in the Garwood model, is a simplification of a two exponent model. GRA

N84-17796# Woods Hole Oceanographic Institution, Mass.
A COMPILATION OF MOORED CURRENT METER DATA FROM THE WESTERN NORTH PACIFIC. VOLUME 31, 1980 - 1982
Ellen Levy and Susan A. Tarbell Aug. 1983 64 p
(Contract N00014-76-C-0197)
(AD-A134234; WHOI-83-30) Avail: NTIS HC A04/MF A01 CSCL 08/3

Summaries of long-term current, temperature and pressure measurements from moored instruments in the western Pacific Ocean (along 152 deg E, between 28 deg N and 41 deg N) are presented. Tables, plots and statistics are presented for filtered and unfiltered time series. There were two consecutive settings of instruments, referred to as WesPac I and II, each spanning a one year interval (nominal). The objective of the experiment was to motivate exploratory descriptions of the low frequency variability in the western North Pacific. GRA

N84-17797# Lamont-Doherty Geological Observatory, Palisades, N. Y.
PHYSICAL OCEANOGRAPHY REPORT STD DATA FROM DRIFTING ICE STATION FRAM 1
T. O. Manley, Werner Tiemann, and Kenneth Hunkins Sep. 1983 143 p
(Contract N00014-76-C-0004)
(AD-A134244; LDGO-83-2) Avail: NTIS HC A07/MF A01 CSCL 08/10

From April 29, 1979 to May 6, 1979 a total of 88 casts were made with a CTD (Conductivity, Temperature and Depth) instrument at the drifting ice station Fram I. Profiles were taken at least twice a day from the surface to 700 m and at more closely spaced intervals during special phases of the experiment. A separate helicopter C/STD survey was also conducted during the experiment and the resulting data were reported separately. Static calibration of the temperature, conductivity and depth sensors was provided by bottle and reversing thermometer data. Least squares, best-fit polynomials, whose parameters were temperature (T), conductivity (C) and depth (D) converted the observed data to final data. Standard level listings of temperature, potential temperature, salinity, sigma-t, specific volume anomaly, dynamic height and sound velocity are given for each cast along with plotted profiles of temperature, salinity and sigma-t. Nested profiles of temperature and salinity are also provided. GRA

N84-17798# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
STATISTICAL ASPECTS OF ICE GOUGING ON THE ALASKAN SHELF OF THE BEAUFORT SEA
W. F. Weeks, P. W. Barnes, D. M. Rearic, and E. Reimnitz Sep. 1983 45 p
(AD-A134428; CRREL-83-21) Avail: NTIS HC A03/MF A01 CSCL 08/10

The probability density function of the gouge depths into the sediment is represented by a simple negative exponential over four decades of gouge frequency. The exceedance probability function is, therefore, e to the -lambda d, where d is the gouge depth in meters and lambda is a constant. The value of lambda shows a general decrease with increasing water depth, from 9/m in shallow water to less than 3/m in water 30 to 35 m deep. The deepest gouge observed was 3.6 m, from a sample of 20, 354 gouges that have depths greater than or equal to 0.2 m. The dominant gouge orientations are usually unimodal and reasonably clustered, with the most frequent alignments roughly parallel to the general trend to the coastline. The value of N(bar) sub 1, the mean number of gouges (deeper than 0.2 m) per kilometer measured normal to the trend of the gouges, varies from 0.2 for protected lagoons to 80 in water between 20 and 38 m deep in unprotected offshore regions. The distribution of the spacings between gouges as measured along a sampling track is a negative exponential. The form of the frequency distribution of N sub 1 varies with water depth and is exponential for lagoons and shallow offshore areas, previously skewed for 10 to 20 m depths off the barrier islands, and near-normal for deeper water. As a Poisson distribution gives a reasonable fit to the N sub 1 distributions for all water depths, it is suggested that gouging can be taken as approximating a Poisson process in both space and time. The distributions of the largest values per kilometer of gouge depths, gouge widths, and the heights of the lateral embankment of sediments plowed from the gouges are also investigated. GRA

N84-17799# Marine Research Inst., Helsinki (Finland).
INVESTIGATION OF ICE DYNAMICS IN THE MARGINAL ICE ZONE Periodic Report, 17 May - 15 Sep. 1983
Matti Lepparanta 15 Sep. 1983 9 p
(Contract DAJA45-83-C-0034)
(AD-A134599; Periodic-Rept-3) Avail: NTIS HC A02/MF A01 CSCL 08/3

A microwave trisponder system consisting of a master station, a slave station, and four remote stations was used to measure ice kinematics in the Fram Strait and the Greenland Sea. The accuracy of this system is three meters, which is better than that in any earlier observations of ice deformation. The drifting phase lasted for eleven days during which time the ship moored to an ice flow, drifted about 50 nautical miles to the northeast. The ice pack was often seen deforming at the rate of 1% per hour which is about one order of magnitude more than is typical in the central Arctic Ocean. A.R.H.

N84-17800# Woods Hole Oceanographic Institution, Mass.
HYDROGRAPHIC STATION DATA OF FIVE SURVEYS OF THE BETA-TRIANGLE IN THE EASTERN NORTH ATLANTIC, 1978 - 1981
David W. Behringer, George P. Knapp, Robert J. Stanley, and Henry M. Stommel Jul. 1983 252 p refs Sponsored in part by NOAA
(Grant NSF OCE-80-15789)
(PB84-100874; WHOI-83-24; NOAA-83092910) Avail: NTIS HC A12/MF A01 CSCL 08J

This is a data report giving temperature, salinity and dissolved oxygen data obtained during five surveys of the beta-triangle area of the eastern North Atlantic in the years 1979-81. The report is divided into two parts. Part 1 consists of a listing of station data obtained on all stations occupied--on the periphery of the triangle, inside it, and some nearby stations outside it. Part 2 is a set of profiles of this data drawn on the three sides of the triangle, for easy reference and visual comparison. Author (GRA)

N84-17801# Massachusetts Inst. of Tech., Cambridge. Sea Grant College Program.
ACOUSTIC DATA AND UNCERTAINTY IN GEOTECHNICAL SITE CHARACTERIZATION OFFSHORE
Lep S. Lee and Gregory B. Baecher Apr. 1983 192 p refs
(Grant NA81AA-D-00069)
(PB84-100908; NOAA-8392908; MITSG-83-13) Avail: NTIS HC A09/MF A01 CSCL 13J

The velocity parameter is an important parameter in acoustical profiling. Methods of determining this parameter are discussed. The empirical relationships between the acoustical properties of deep sea sediments and their physical properties are examined and good correlations are found to exist. The physical properties are also found to correlate well with the sediments' geotechnical elastic properties. This then gives an indirect means of correlating between the acoustical properties and the elastic properties. Next the reliability of predicting the state of regions outside and between parallel seismic (acoustical) profile lines is examined. From these predictions, a two-color map of the region examined is drawn. GRA

N84-17802# National Oceanographic Data Center, Washington, D. C.
NODC (NATIONAL OCEANOGRAPHIC DATA CENTER) INVENTORY OF XBT DATA ALONG TRANSECTS IN U.S. ATLANTIC AND GULF COASTAL WATERS FROM NMFS/MARD SHIP OF OPPORTUNITY PROGRAM FOR 1981
Nov. 1983 26 p refs
(PB84-122662; KORD-12; NOAA-83112101) Avail: NTIS HC A03/MF A01 CSCL 08J

This inventory of expendable bathythermograph (XBT) observations along transects in U.S. Atlantic and Gulf coastal waters adds to the Ship of Opportunity Program XBT data listed in the former publications. This inventory contains monthly location plots of transects along which XBT observations were made in 1981 and for which the processed XBT data are available in NODC's XBT data file. This graphic comprises a station location plot, a plot of surface seawater temperature and salinity along the transect, and two temperature vertical-section plots that can be produced over specified depth ranges. GRA

N84-17645# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).
INVESTIGATIONS OF DOPPLER POSITION DETERMINATION FOLLOWING THE SHORT ARC AND SEMI SHORT ARC TECHNIQUES [UNTERSUCHUNGEN ZUR DOPPLERPOSITIONSBESTIMMUNG NACH DER SEMI-SHORT-ARC- UND DER SHORT-ARC-METHODE]
Hermann Hauck, Dieter Leigemann, and Wolfgang Schlueter *In its* Rept. on Cartography and Geodaesie, Ser. 1: Original Repts., No. 90 1982 p 9-27 refs In GERMAN; ENGLISH summary
(For primary document see N84-17643 08-43)
Avail: NTIS HC A05/MF A01

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N84-17803# Materials Research Labs., Melbourne (Australia).
THE RESPONSE OF RATS TO CUTANEOUS DOSING WITH TRICHOTHECENE MYCOTOXINS
H. D. Crone Oct. 1983 22 p
(MRL-R-902; AR-003-798) Avail: NTIS HC A02/MF A01

T-2 toxin and diacetoxyscirpenol (DAS) formed deep necrotic ulcers on rat skin at doses of 2 micrograms and 6 micrograms respectively. Verrucarin A and Roridin A were relatively ineffective at producing skin lesions. The percutaneous LDsub 50 of T-2 or DAS was found to be well in excess of 10 mg/kg. DMSO had no marked effect in increasing wound severity or systematic toxicity as opposed to ethyl acetate as the application vehicle. No synergism between T-2 and DAS was found. Histological examination of skin lesions revealed the typical inflammatory reaction that is also caused by thermal burns or other necrotizing agents. Thin layer chromatography of the toxins is described, as a method to check purity and stability. Author

N84-17804*# National Aeronautics and Space Administration, Washington, D. C.
THE EFFECT OF VARIOUS CARBON SOURCES ON THE GROWTH OF SINGLE-CELLED CYANOPHYTA
I. A. Avilov and E. S. Sidorenkova Jul. 1983 15 p refs Transl. into ENGLISH from Vestn. Leningr. Univ., Ser. Biol. (USSR), no. 15, 1980 p 97-103 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77090; NAS 1.15:77090) Avail: NTIS HC A02/MF A01 CSCL 06C

In 19 strains of unicellular blue-green algae, belonging to general Synechococcus, Synechocystis, Aphanocapsa and Aphanothece, the capacity of growth under mixotrophic conditions in mineral media with organic carbon sources (carbohydrates, polyols) was investigated. At moderate light intensity (1200 lx) and 0.5% of carbon source there was revealed: (1) Stimulation of growth; (2) Partial or complete inhibition of growth; (3) No influence of carbohydrate and polyols on the growth of some algae strains. Three physiological groups for the investigated strains have been outlined on the basis of data obtained. The possibility of using the differences revealed in classification of unicellular blue-green algae is discussed. Author

N84-17805# Information Ventures, Inc., Philadelphia, Pa.
BIOLOGICAL EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, VOLUME 7, NUMBER 2-4, JULY - DECEMBER 1982
B. H. Kleinstein Jul. 1983 186 p
(Contract N00014-83-C-0004)
(AD-A134674) Avail: NTIS HC A09/MF A01 CSCL 06/18

The literature digest contains original abstracts of English and foreign-language research literature, current research summaries, news items and announcements and information on relevant meetings and conferences. Subject and author indices are provided for all literature abstracts. Original abstracts are prepared based on data presented in the text, tables, and figures in the document. Where appropriate, quantitative data such as wavelength or frequency modulation, pulse width, duty cycle, incident power density, specific absorption rate, drugs or other stimuli, exposure duration and regime, and end point are included in each abstract. Author (GRA)

N84-17806# Kentucky Univ., Lexington. Dept. of Anatomy.
STUDIES OF ELECTRICALLY STIMULATED RAT LIMB AND PERIPHERAL NERVE REGENERATION Final Technical Report, May 1979 - Jun. 1983
Stephen D. Smith and William G. Winter 25 Aug. 1983 38 p
(Contract N00014-79-C-0332)
(AD-A134358; Rept-6) Avail: NTIS HC A03/MF A01 CSCL 06/16

This report covers research into the stimulated regeneration of subadult rat limbs and peripheral nerves. Regeneration of limbs was stimulated by implants of direct current devices delivering 10 to the minus 6th power A/sq mm, by pulsed magnetic fields delivered as short trains of asymmetric pulses repeating at 15 Hz, and by a combination of the two. Direct current fields produced significant amounts of new tissue organized into proximo-distal groupings reminiscent of carpal elements. PMF produced large amounts of new tissue, chiefly muscle. Peripheral nerve regeneration was also elicited by the implantation of D.C. devices (galvanic) and by PMF. Both methods produced significantly improved nerve regeneration. Several new techniques for stimulation and for evaluation of the response have been developed, but for this report, integrated monophasic compound action potentials (IMCAPS) were the chief means of evaluation. Improvements in regeneration of the order of 20% were found. GRA

N84-17807# Argonne National Lab., Ill. Div. of Biological and Medical Research.
COMPARISON OF ORGANISMS AND CELL TYPES USING TWO-DIMENSIONAL ELECTROPHORESIS
N. Leigh Anderson 1983 22 p refs Presented at the Biol. and Characterization of Cultured Vertebrate Cell Lines Symp., Bethesda, Md., 2 Oct. 1983
(Contract W-31-109-eng-38)
(DE84-003574; CONF-8310221-1) Avail: NTIS HC A02/MF A01

Various approaches to the use of two dimensional electrophoretic patterns for the quantitation of protein taxonomic distances are discussed. In comparisons of closely related organisms approximately 1/3 of all single base substitutions may be detected in aproximately 3 x 10(6) base pairs of coding DNA. This represents the highest data rate available in any genomic surveillance technique aimed at measuring single base changes. In comparisons of more distantly related organisms, current 2-D gels allow exploitation of a range of spot overlap extending from about 2.6% to greater than or equal to 90%. Within this range, evolutionary distances characteristics of family, genus, and species differences may be measurable directly in terms of base substitutions per nucleotide averaged over very large amounts of coding DNA. DOE

N84-17808# Johns Hopkins Univ., Baltimore, Md. Dept. of Biology.
BIOCHEMICAL INDICATORS OF THERMAL STRESS: SELECTED GENETIC AND PHYSIOLOGICAL PARAMETERS Final Report
Dennis A. Powers May 1983 80 p refs
(PB84-100122; PPSP/PPRP-75) Avail: NTIS HC A05/MF A01 CSCL 06T

The model species Fundulus heteroclitus was sampled from the intake and thermally elevated discharge water of five power plants and twenty-five other areas in the Chesapeake Bay which are not associated with power plants. Genetic and physiological measurements were made on sampled populations and differences correlated with environmental temperature, oxygen and/or salinity. Finally, attempts to sort out some of these variables were made by employing laboratory experiments at the whole organism, cellular, and biochemical levels. GRA

N84-17809# Kentucky Univ., Lexington. Coll. of Pharmacy.
RABBIT NEUROBEHAVIORAL TOXICITY FROM ALUMINUM Final Report
Robert A. Yokel May 1983 28 p refs
(Grant PHS-MH-34188)
(PB84-103266; NIMH-83-335) Avail: NTIS HC A03/MF A01 CSCL 06T

A model for the production of neurobehaviorial toxicity induced by systematic aluminum exposure was developed. Nictitating membrane extension conditioning was used to assess the influence of the aluminum treatment on learning (acquisition and conditioned response) and memory (retention of the response 10 days after acquisition) in the adult rabbit. Tissue aluminum level were determined 5 weeks after the completion of aluminum treatment in 5 CNS regions and nine peripheral tissues. The presence of neurofibrillary tangles was assessed in the brains of some of the treated and control rabbits. GRA

N84-17810# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
IN VITRO CHLOROPHYLL PHOTOSYNTHETIC REACTION Annual Report, Jan. - Dec. 1983
Francis K. Fong, Angelo J. Alfano, and Michael S. Showell Aug. 1983 71 p refs Sponsored by Gas Research Inst.
(PB84-104892; GRI-81/0124) Avail: NTIS HC A04/MF A01 CSCL 07E

The photosynthetic mechanism using elementary constituents of in vivo photosystems is reconstituted. The mechanisms of plant photosynthesis were unraveled. An array of experimental results was obtained making use of various instrumental methods: (1) Electron spin resonance and photogalvanic current measurements provide evidence for a particularly effective contribution from a dimeric aggregate of hydrated chlorophyll to in vitro photosynthetic activity; (2) Gas chromatographic and ion cyclotron resonance measurements support the in vitro photosystem's ability to catalyze water splitting; (3) Fluorescence lifetime measurements were made to examine the excited singlet and triplet paths of the hydrated chlorophyll aggregates; (4) From the observation of oscillatory delayed fluroescence in monomeric hydrated chlorophyll it has been concluded that the smallest hydrated Chl a complex capable of photocatalyzing water splitting is a dimer. GRA

N84-17853*# Georgia Inst. of Tech., Atlanta.
[TECHNIQUES FOR THE INORGANIC ANALYSIS IN A CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM] Final Report
In its Inorgan. Anal. in a Controlled Ecol. Life Support System Jun. 1983 12 p (For primary document see N84-17852 08-54)
Avail: NTIS HC A02/MF A01 CSCL 06K

N84-17854*# Georgia Inst. of Tech., Atlanta.
STANDARD RESEARCH MATERIALS: FECES AND URINE Final Report
In its Inorg. Anal. in a Controlled Ecol. Life Support System Jun. 1983 9 p ref (For primary document see N84-17852 08-54)
Avail: NTIS HC A02/MF A01 CSCL 06P

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N84-17811# Army Intelligence and Threat Analysis Center, Arlington, Va.
MILITARY MEDICAL JOURNAL, NO. 7, 1983
Apr. 1983 130 p refs Transl. into ENGLISH of Voenno-Med. Zh. (Moscow), no. 7, Jul. 1983
(L-2456) Avail: NTIS HC A07/MF A01

Medical care for troops and the training of medical personnel for the military are discussed. Topics covered include therapy, epidemiology, hygiene, physical fitness, and chemical, surgical, and radiological procedures. For individual titles, see N84-17812 through N84-17813.

N84-17812# Army Intelligence and Threat Analysis Center, Arlington, Va.
PREVENTION OF FLIGHT FATIGUE BY PHYSICAL TRAINING
M. T. Lozha *In its* Mil. Med. J., No. 7, 1983 Apr. 1983 p 71-74 Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 7, Jul. 1983 Original language document was announced as A83-58570 (For primary document see N84-17811 08-52)
Avail: NTIS HC A07/MF A01

An experiment was conducted in order to determine whether physical training in the morning soon after awakening could be useful in preventing flight fatigue. One group (control) performed normal exercises each morning, while the other (experimental) group under supervision by medical personnel, performed a special series of exercises each morning to prevent fatigue. Results showed that after 4 months of training, the experimental group exhibited a significantly better functional condition of the cardiovascular and respiratory systems than the control group. In addition, it was found that the lack of close medical supervision significantly reduced the effectiveness of this exercise program. A.R.H.

N84-17813# Army Intelligence and Threat Analysis Center, Arlington, Va.
EFFECT OF THE MICROCLIMATE ON THE NIGHT SLEEP AND PHYSICAL FITNESS OF SEAMEN DURING A CRUISE IN THE LOW LATITUDES
G. I. Novozhilov, V. V. Pastukhov, and N. N. Plahov *In its* Mil. Med. J., No. 7, 1983 Apr. 1983 p 75-79 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 7, Jul. 1983 (For primary document see N84-17811 08-52)
Avail: NTIS HC A07/MF A01

Twenty-five seamen aged 18 to 22 years were the subjects in a study to determine how various microclimatic conditions in the sleeping quarters affect the quality of sleep, heat exchange in the body, and autonomic function; and how the quality of sleep influences the physical fitness of seamen during a cruise in the low latitudes. Measurement of the functional condition of the subjects before and after night sleep shows that the sleep of seamen under uncomfortable conditions during a cruise in the low latitudes is shallow, unrefreshing, and accompanied by frequent awakenings. Heat stress develops during the night as shown by

higher body temperature after sleep, rapid heart beat, and increased sweating compared to individuals sleeping under comfortable conditions. As a result of heat stress, the energy expended on standard physical exertion increases, especially in the first half of the cruise. A.R.H.

N84-17814# Army Intelligence and Threat Analysis Center, Arlington, Va.
MILITARY MEDICAL JOURNAL, NO. 2, 1983
Feb. 1983 134 p refs Transl. into ENGLISH of Voenno-Med. Zh. (Moscow), no. 2, Feb. 1983
(L-2341) Avail: NTIS HC A07/MF A01

Various topics in military medicine are addressed. Specific subject categories include field medical support and medical personnel training, epidemiology and infectious diseases, hygiene and physiology of military labor, flight and naval medicine, and treatment and prophylaxis. For individual titles, see N84-17815 through N84-17816.

N84-17815# Army Intelligence and Threat Analysis Center, Arlington, Va.
ASSESSMENT OF THE FUNCTIONAL STATE OF THE HEART MUSCLE IN AIRCREW MEMBERS BY MEANS BY BICYCLE ERGOMETRY
E. G. Mukhamedov, A. G. Bryukhovetskiy, and L. P. Pukach *In its* Mil. Med. J., No. 2, 1983 p 63-66 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 2, Feb. 1983 (For primary document see N84-17814 08-52)
Avail: NTIS HC A07/MF A01

Studies have shown that, with reduction of the functional capacity of the heart muscle, there is an increase in the duration of the electrical systole and an increase in the systolic index both at rest and with physical loads. Tests were performed the goal of which was to evaluate the functional state of the heart muscle, considering the level of maximum arterial pressure and duration of the electrical systole as the most efficient period of the heart cycle. For analysis, a calculated value, arbitrarily called the 'systolic product' was used. It was calculated by the formula: Systolic product = (AD x Q-T)/RR arbitrary units where AD is the maximum arterial pressure in mm Hq, Q - T is the duration of the electrical systole in seconds, RR is the duration of the cardiac cycle in seconds. The test group included 46 heart patients and 50 healthy aircrew members ranging in age from 25 to 52 years. The results indicate a gradual increase in systolic product with an increase in physical load for both patients and healthy persons; however the increase in patients with atherosclerosis was more pronounced. At rest the systolic product of patients was reliably higher than that of healthy persons. M.G.

N84-17816# Army Intelligence and Threat Analysis Center, Arlington, Va.
THE EFFECT OF SMOKING ON THE NON-SPECIFIC RESISTANCE OF THE ORGANISM OF SEAMEN AT SEA
V. N. Bortnovskiy *In its* Mil. Med. J., No. 2, 1983 Feb. 1983 p 67-70 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 2, Feb. 1983 (For primary document see N84-17814 08-52)
Avail: NTIS HC A07/MF A01

The effect of smoking during a long voyage on the non-specific anti-infection resistance of the organism of seamen was studied. The test groups included 74 naval specialists ranging in age from 25 to 32 years and including 38 persons who had smoked regularly for at least five years. The leukocyte count, the absorption function of the leukocytes, the intensity of absorption, the adhesive capacity and the digestive activity, and the deep autoflora of the skin were studied. Also, the physical fitness for work, the subjective status of the subjects, and infectious morbidity were considered. The seamen were examined in the period between voyages, at the beginning of the voyage, after one month at sea, at the mid-point of the voyage and at the end of the voyage. The results indicate that smoking during a long sea voyage had a detrimental effect on the non-specific mechanisms of anti-infection protection, reduces fitness for work, and increase infectious pathology. M.G.

N84-17817# Army Intelligence and Threat Analysis Center, Arlington, Va.
MILITARY MEDICAL JOURNAL, NO. 3, 1983
Mar. 1983 139 p refs Transl. into ENGLISH of Voenno-Med. Zh. (Moscow), no. 3, Mar. 1983
(L-2399) Avail: NTIS HC A07/MF A01

Various topics relative to military and aerospce medicine are discussed. Gunshot wounds, blood transfusions, blood plasma, conjunctiva, pulmonary circulation, epidemiology, and therapy are discussed. For individual titles, see N84-17818 through N84-17819.

N84-17818# Army Intelligence and Threat Analysis Center, Arlington, Va.
INVESTIGATION OF THE MICROCIRCULATION OF THE CONJUNCTIVA IN AIRMEN WITH THE INITIAL SYMPTOMS OF CEREBRAL ATHEROSCLEROSIS
B. I. Parmenov-Trifilov *In its* Mil. Med. J., No. 3, 1983 Mar. 1983 p 60-63 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 3, Mar. 1983 p 44-46 Original language document was announced as A83-30949 (For primary document see N84-17817 08-52)
Avail: NTIS HC A07/MF A01

The investigation of the microcirculation of the conjunctiva in airmen with the initial symptoms of cerebral atherosclerosis is discussed. The study of the microcirculation of the eye by biomicroscopy of the conjunctiva blood vessels followed by photography is the method of choice for examining flying personnel. It is informative, has no contraindications, produces no complications, and takes little time. The microcirculation of the conjunctiva may be examined for early diagnosis of atherosclerosis in airmen. The method is a supplemental one and the data obtained with it can be used in conjunction with the results of clinicial and biochemical examinations to evaluate flight fitness. R.J.F.

N84-17819# Army Intelligence and Threat Analysis Center, Arlington, Va.
CHANGES IN THE T AND B SYSTEMS OF IMMUNITY IN SEAMEN DURING A LONG CRUISE
V. S. Novikov *In its* Mil. Med. J., No. 3, 1983 Mar. 1983 p 64-66 Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 3, Mar. 1983 p 46-47 Original language document was announced as A83-30950 (For primary document see N84-17817 08-52)
Avail: NTIS HC A07/MF A01

The activity of immune reactions is studied in sailors during extended sea voyages and the physiological significance of these reactions is examined during the adaptation of the sailors to different environmental conditions. The changes in the content of the T, B, and O lymphocytes were determined in 5 sailors (18-21 years of age) at various times before, during, and after an extended sea voyage. Results show that major changes in the functioning of the immune systems occur during the voyages. The content of T lymphocytes in the blood increased after one month at sea which indicates a higher stress on the T immune system during the adaptation to the conditions of sailing. The content of T and B lymphocytes decreased after one month of sailing which indicates a weakening of the functioning of the T and B immune systems. It is concluded that these changes are evidence of the weakening of the antiinfection stability of the subjects and indicate the possibility of increases in autoimmune diseases. Author

N84-17820*# Management and Technical Services Co., Houston, Tex.
ENERGY BALANCE AND THE COMPOSITION OF WEIGHT LOSS DURING PROLONGED SPACE FLIGHT
Joel I. Leonard 20 Oct. 1982 104 p refs
(Contracts NAS9-12932; NAS9-14523; NAS9-15487; NAS9-16328)
(NASA-CR-171745; NAS 1.26:171745; TIR-2114-MED-2012) Avail: NTIS HC A06/MF A01 CSCL 06S

Integrated metabolic balance analysis, Skylab integrated metabolic balance analysis and computer simulation of fluid-electrolyte responses to zero-g, overall mission weight and tissue

losses, energy balance, diet and exercise, continuous changes, electrolyte losses, caloric and exercise requirements, and body composition are discussed. N.W.

N84-17821*# Management and Technical Services Co., Houston, Tex. Dept. of Biomedical Research.
WATER IMMERSION AND ITS COMPUTER SIMULATION AS ANALOGS OF WEIGHTLESSNESS Interim Report
Joel I. Leonard Aug. 1982 66 p refs
(Contract NAS9-16328)
(NASA-CR-171746; NAS 1.26:171746; TIR-2114-MED-2005) Avail: NTIS HC A04/MF A01 CSCL 06P

Experimental studies and computer simulations of water immersion are summarized and discussed with regard to their utility as analogs of weightlessness. Emphasis is placed on describing and interpreting the renal, endocrine, fluid, and circulatory changes that take place during immersion. A mathematical model, based on concepts of fluid volume regulation, is shown to be well suited to simulate the dynamic responses to water immersion. Further, it is shown that such a model provides a means to study specific mechanisms and pathways involved in the immersion response. A number of hypotheses are evaluated with the model related to the effects of dehydration, venous pressure disturbances, the control of ADH, and changes in plasma-interstitial volume. By inference, it is suggested that most of the model's responses to water immersion are plausible predictions of the acute changes expected, but not yet measured, during space flight. One important prediction of the model is that previous attempts to measure a diuresis during space flight failed because astronauts may have been dehydrated and urine samples were pooled over 24-hour periods. S.L.

N84-17822# Texas Univ., Austin.
MATHEMATICAL SIMULATION OF THE CARDIOPULMONARY SYSTEM Final Report, 1 Oct. 1981 - 31 Aug. 1983
R. E. Collins, L. Carmack, and D. L. Martin 19 Aug. 1983 64 p
(Grant AF-AFOSR-0123-79; AF Proj. 2312)
(AD-A135460; AFOSR-83-0999TR) Avail: NTIS HC A04/MF A01 CSCL 12/1

Multi-chamber, lumped parameter models of the pulmonary and circulatory systems have been developed which incorporate effects of whole-body accelerations (WBA) for any body orientation and a variety of breathing maneuvers. The pulmonary model has been used in an extensive study of effects of sustained WBA on pulmonary mechanics and ventilation. This study investigated the effectiveness of altering seat back angle to increase G-tolerance. The development and testing of the separate pulmonary and circulatory models has been reported in previous reports, as well as the above described WBA study. This final report describes latest efforts to incorporate feedback and control mechanisms in the circulatory model to simulate the baroreceptor and chemoreceptor actions regulating blood flow and blood pressure in the human body. This work is not yet complete. Also described is a partially completed study using the pulmonary model to test and implement a non-invasive technique for diagnosing ventilation distribution dysfunctions. Author (GRA)

N84-17823# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
BLOOD FLOW MEASUREMENTS UNDER HIGH-G CONDITIONS: EARLY PREDICTION OF Gz TOLERANCE Interim Report
Leonid Hrebien Aug. 1983 28 p
(AD-A134653; NADC-83115-60) Avail: NTIS HC A03/MF A01 CSCL 06/19

A method is presented for the prediction of man's +Gz tolerance in human centrifuge experiments without exposing the subject to excessive levels of positive gravity. The parameter that is measured is blood velocity in the temporal artery using an ultrasonic doppler velocimeter. Rather than using the cessation of forward blood velocity as an end point in +Gz tolerance studies, it is possible to use physiologic compensatory responses to decreased cerebral blood pressure as predictors of ultimate cessation of blood flow to the head. Five subjects were exposed to five different +Gz onset ramps and the results are discussed in this report. GRA

N84-17824# Army Research Inst. of Environmental Medicine, Natick, Mass.
OVERUSE INJURIES OF THE LOWER EXTREMITIES ASSOCIATED WITH MARCHING, JOGGING AND RUNNING. A REVIEW
B. H. Jones Oct. 1983 8 p Repr. from Military Medicine, v. 148, Oct. 1983 p 783-787
(DA Proj. 3E1-62777-A-879)
(AD-A134672; USARIEM-M-9/83) Avail: NTIS HC A02/MF A01 CSCL 06/5

Army basic trainees who wore boots through one seven-week basic training cycle were studied. Exercise-related and performance-limiting conditions in female trainees were emphasized. Some comparative data were collected on injuries among male counterparts of these females. The overall incidence of lower extremity injuries to females was 62 percent (215 of 347) and for males 26 percent (202 of 770). The average injury sustained by these women resulted in 13 days of less training time. GRA

N84-17825# Naval Health Research Center, San Diego, Calif. Environmental Physiology Dept.
EXTENDING HUMAN EFFECTIVENESS DURING SUSTAINED OPERATIONS THROUGH SLEEP MANAGEMENT Interim Report
P. Naitoh, C. E. Englund, and D. H. Ryman Aug. 1983 21 p Presented at NATO Defense Res. Group Seminar on the Human as a Limiting Element in Military Service, Toronto, 2-4 May 1983 Submitted for publication
(F58-528)
(AD-A134782; NAVHLTHRSCHC-83-13) Avail: NTIS HC A02/MF A01 CSCL 05/10

Sustained Operations (SUSOPs) represent a prolonged period of continuous work (CW) in the performance of essential services. In many military operations, demands for CW cannot be easily met by orderly sharing of work through arranging soldiers on 'shift or night work' schedules. Especially during times of emergency, military personnel must often work continuously without sleep for long hours at physically demanding tasks while remaining mentally alert. This technical paper summarizes four SUSOP studies, 1 through 4, to describe cognitive performance decrements due to continuously working for two episodes of 20 hours each, with a short sleep period of 3 or 4 hours permitted between these two CWs. This paper also reports on an application of sleep logistics in evaluation of effectiveness of napping in the early morning period so as to counteract performance decrement due to a CW. Short napping of 3 or 4 hours in the early morning was found not to be completely effective in restoring Marine Corps volunteers from fatigue and sleepiness of 20 hours CW, thus making them ready to resume the second 2-hour CW with high quality performance. However, some task performances were found to be improved by napping. These findings suggest that napping can be used as an effective intervention technique for maintaining and even enhancing the cognitive performance during CW. GRA

N84-17826# Army Research Inst. of Environmental Medicine, Natick, Mass.
PHYSIOLOGICAL RESPONSES TO PROLONGED UPPER BODY EXERCISE
N. A. Pimental, M. N. Sawka, D. S. Billings, and L. A. Trad Oct. 1983 24 p
(AF Proj. 3E1-63777-A-879)
(AD-A134811; USARIEM-M-5/84) Avail: NTIS HC A02/MF A01 CSCL 06/19

Previous investigations have not examined physiological responses to prolonged upper body exercise. Knowledge of the feasibility of performing this type of exercise and the elicited responses could have application in designing continuous training programs for the upper body muscle groups. Nine male volunteers, with a peak oxygen uptake of 49 + or - 7 for cycle and 35 + or - 6 ml kg min for arm crank exercise, completed four prolonged

(60 min) exercise tests. These data demonstrate that upper body exercise can be performed for prolonged periods of time at a relative intensity sufficient to elicit a cardiovascular training effect. However, since heart rates are lower during upper than lower body exercise at 60% of peak oxygen uptake, exercise prescriptions which are based on heart rate may need to be modified for upper body exercise. GRA

N84-17827# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex.
RATIONALE FOR A THRESHOLD LIMIT VALUE (TLV)R FOR JP-4/JET B WIDE CUT AVIATION TURBINE FUEL Final Report
E. C. Bishop, M. G. MacNaughton, R. T. P. deTreville, and R. B. Drawbaugh Apr. 1983 16 p
(AD-A134814; OEHL-83-128EH111DGA) Avail: NTIS HC A02/MF A01 CSCL 06/20

This report provides rationale for a Threshold Limit Value (TLV) Superscript R of 700 mg/m cu m (200 ppm, 1.5% LEL) and a Short Term Exposure Limit (STEL) of 1050 mg/g cu m (300 ppm 2.3% LEL) as n-hexane with a skin notation for JP-4/Jet B wide cut aviation turbine fuel. This recommendation is based upon a thorough review of the literature and USAF experience with JP-4 exposures. Author (GRA)

N84-17828# Massachusetts Inst. of Tech., Cambridge. Man-Vehicle Lab.
TEMPORAL ASPECTS OF EYE MOVEMENT WHEN VIEWING MULTIPLE TARGETS Interim Report, Oct. 1981 - Sep. 1982
Y. Y. Zeevi, P. A. Wetzel, and L. R. Young Nov. 1983 69 p
(Contract F33615-81-K-0011)
(AD-A134853; AFHRL-TP-83-6) Avail: NTIS HC A04/MF A01 CSCL 05/10

A technique of eye position measurement and analysis was used to investigate the time necessary for processing visual information by comparing the mean response latency time of single targets to the response means of other novel stimuli. In all cases, stimuli were visual, context-free, point source targets, randomized for type, order of appearance, and time course. The separation of the visual fields is exploited to selectively present targets to either or both hemispheres. An asymmetry in single target left-right response latency time was observed in nearly all subjects. In all cases, there was a significant increase in response latency time when targets were presented to each hemisphere simultaneously. Delayed bihemispheric stimulation produced changes in response latency that were similar in both directions and the response latency increased still further when targets were presented sequentially. These studies helped to determine the timing of events prior to the execution of a saccade. The single and bihemispheric paradigms have also proven useful in studying the mechanisms and organization of visual information processing. Author (GRA)

N84-17829# Army Cold Regions Test Center, Fort Greely, Ark.
ARCTIC PERSONNEL EFFECTS Final Report
Sep. 1983 25 p
(AD-A134892; TOP-1-1-003) Avail: NTIS HC A02/MF A01 CSCL 06/19

This document provides background information on the physiological effects of extreme cold on the human body. A brief overview of some of the physiological problems of operation in a cold environment and the procedures used to overcome these problems are provided along with the detailed techniques and requirements for tests involving the effects of a cold environment on personnel. Author (GRA)

N84-17830# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.
THE OBJECTIVE EVALUATION OF AIRCREW PROTECTIVE BREATHING EQUIPMENT. 5: MASK/GOGGLES COMBINATIONS FOR FEMALE CREWMEMBERS
D. DESteiguer, J. T. Saldivar, E. A. Higgins, and G. E. Funkhouser Jul. 1983 12 p
(AD-A134912; FAA-AM-83-14-5) Avail: NTIS HC A02/MF A01 CSCL 06/17

A study was conducted to determine the degree of respiratory and visual protection given to the female crewmember by various crew oxygen mask/goggle combinations. The acceptance criteria for the mask/goggle combinations were for 10 of 12 test subjects to maintain a contaminant ratio of 0.05 or less in the oxygen mask and/or simultaneously 0.1 or less in the goggle while wearing eyeglasses. Of the 23 mask/goggle combinations tested with female subjects, 8 failed to meet the acceptance criteria for adequate protection. Comparison tests on anthropometric data from male and female subjects suggest that the failures may be due, in part, to size differences in cranial and facial dimensions. GRA

N84-17831# Army Research Inst. of Environmental Medicine, Natick, Mass.
AUTONOMIC INFLUENCES ON PERIPHERAL CIRCULATORY AND THERMAL RESPONSES TO COLD
Carl A. Ohata, Gordon D. Powers, and Philip H. Scaglione 1981 41 p
(AD-A134444; USARIEM-M-4/84) Avail: NTIS HC A03/MF A01 CSCL 06/19

The effects of bilateral denervations of the lumbar sympathetic chain, vagus nerves, and sacral ventral roots on peripheral circulatory and thermal responses during local cold exposure of a cat hindlimb were determined. Cold exposure apparently produced a peripheral vascoconstriction mediated by a somatosympathetic reflex and local mechanisms. Interruption of the L(3) sympathetic hain ipsilateral as well as contralateral to the cold-exposed hindlimb produced a marked reduction in vascular resistance, a femoral arterial hyperemia, and a warming of the footpad and increased heat loss from the footpad. These responses were acute suggesting that local mechanisms can predominate in the absence of neurogenic mechanisms to restore peripheral vasoconstriction. Interruption of the vagus nerves and sacral ventral roots had little effect on the peripheral circulatory and thermal responses to cold. This study identified the primary autonomic pathway mediating peripheral vasoconstriction during cold exposure as the efferent sympathetic nerves. GRA

N84-17832# Pennsylvania Coll. of Optometry, Philadelphia.
ERG (ELECTRORETINOGRAM) IMPLICIT TIME: AN EXPLORATION OF HIGH FREQUENCY WAVELETS RECORDED IN THE HUMAN VISUAL SYSTEM Final Report, 10 May 1979 - 9 May 1983
John B. Siegfried 15 Oct. 1983 26 p
(Contract DAAG29-79-C-0103)
(AD-A134575; ARO-16272.2-LS) Avail: NTIS HC A03/MF A01 CSCL 06/16

Previous research by the author had demonstrated that the spectral sensitivity of the visual system as measured by the visual evoked potential from the human scalp exhibited discrepancies from the spectral sensitivity function as measured by psychophysical techniques. These discrepancies were in the short wavelength (blue) region of the visible spectrum. Such discrepancies were explained by the discovery that blue lights evoked cortical potentials with longer latencies and implicit times than lights which stimulate the middle and long wavelength sensitive mechanisms. The current research deals with a further elucidation of this finding, by studying the fast wavelets (oscillatory potentials) arising in the retina and measured by means of the electroretinogram. High frequency wavelets were also observed at the scalp in the visual evoked potential. GRA

N84-17833# Texas Univ., Galveston.
FORMATION AND REMODELING OF THE EARLY WOUND MATRIX Semiannual Report
Paul H. Weigel, Gerald M. Fuller, and Robert LeBoeuf 1 Nov. 1983 7 p
(Contract N00014-82-K-0279)
(AD-A134576) Avail: NTIS HC A02/MF A01 CSCL 06/5

We have proposed that an early event in wound healing involves the synthesis of hyaluronic acid (HA) by blood cells in the clot and that HA specifically interacts with fibrin to create a

second matrix within the wound. Peripheral cells then migrate into the wound and begin to remodel the matrix. To test this model we have synthesized a unique derivative of HA, hyaluronate-amine, which has been used to prepare (1) radioiodinated HA to study cell surface receptors, (2) synthetic culture surfaces to study cell interactions with immobilized HA and (3) HA-sepharose, an affinity chromatography media. We have also used the HA-sepharose to show, as predicted by our proposed model, that fibrinogen specifically binds to HA. This is the first demonstration of such an interaction and would be of major significance in understanding the important early events necessary for prompt and efficient wound healing. GRA

N84-17834# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
HUMAN REACTIONS TO TRANSIENT ELECTRIC CURRENTS, VOLUME 8 Annual Report, Jul. 1982 - Jun. 1983
J. P. Reilly, W. Larkin, R. J. Taylor, V. T. Freeman, and L. B. Kittler Jul. 1983 151 p refs Sponsored in part by the Maryland Power Plant Siting Program and the Canadian Electrical Association
(PB84-112895; JHU/APL/CPE-8305-Vol-8) Avail: NTIS HC A08/MF A01 CSCL 06T

The report describes research on human sensory responses to transient electrical currents. Stimuli include those that may be encountered with capactive discharges in high-strength dc or 60-HZ ac oscillatory currents. Measurements of electrical impedance properties of the human body are also described. Parameters studied involve variables of the stimulus (e.g., magnitude, discharge capacitance, time constant, monophasic versus biphasic currents), variebles involving the subject (e.g., body location, skin hydration), and variables involving the method of applying the stimulus (e.g., electrode size, spark discharge versus contact current). Sensory reactions are studied for both threshold and suprathreshold currents. A neuroelectric model is developed and applied to a variety of the experimental findings. Author (GRA)

N84-17835# Systems Applications, Inc., San Rafael, Calif.
HUMAN EXPOSURE TO ATMOSPHERIC CONCENTRATIONS TO SELECTED CHEMICALS, VOLUME 1 Interim Report
Gerald E. Anderson Sep. 1983 230 p refs 2 Vol.
(Contract EPA-68-02-3066)
(PB84-102540; SAI-58-EF81-156R2) Avail: NTIS HC A11/MF A01 CSCL 06T

Public exposure to atmospheric concentrations of some forty chemicals is estimated on a nationwide basis. Information that are helpful for determining which of the chemicals to study in more detail and in what order is provided. The emphasis is on estimates that support rough relative comparisons among the chemicals. The study makes free use of such techniques as algorithms for estimating emissions rather than actual emissions data, constructed plant locations rather than actual plant locations, simplified dispersion modeling to estimate ambient air concentrations, and a constructed population file that relief on extrapolation of 1970 Bureau of Census data on where people lived. GRA

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N84-17836# Army Intelligence and Threat Analysis Center, Arlington, Va.
MILITARY MEDICAL JOURNAL, NO. 4, 1983
Apr. 1983 133 p refs Transl. into ENGLISH of Voenno-Med. Zh. (Moscow), no. 4, Apr. 1983
(L-2403) Avail: NTIS HC A07/MF A01

Several topics is clinical medicine that relate to military activities are discussed. Flight crew work capacity, cardiology, shock, competition and infectious diseases are discussed. For individual titles, see N84-17837 through N84-17837.

N84-17837# Army Intelligence and Threat Analysis Center, Arlington, Va.
THE CONCEPT OF WORKING CAPACITY OF THE FLIGHT CREW
N. M. Rudnyy and V. A. Bodrov *In its* Mil. Med. J., No. 4, 1983 Apr. 1983 p 65-72 refs Transl. into ENGLISH from Voenno-Med. Zh. (Moscow), no. 4, Apr. 1983 (For primary document see N84-17836 08-53)
Avail: NTIS HC A07/MF A01

The concept of work capacity, especially as it applies to flight crews, is discussed. It is argued that working capacity should be looked upon as one of the basic social - biological properties of man, reflecting his ability to perform work of specific content under specific conditions of activity for a specific time and with the required effectiveness and quality. The structure of the working capacity of aviation specialists and the classification of flying crew working capacity indices are discussed. R.J.F.

N84-17838*# Massachusetts Inst. of Tech., Cambridge. Lab. for Man-Machine Systems.
AUTOMATION, SUPERVISORY CONTROL AND WORKLOAD IN FLIGHT MANAGEMENT Final Report, Nov. 1975 - Nov. 1980
Thomas B. Sheridan Apr. 1983 13 p refs
(Grant NsG-2118)
(NASA-CR-166474; NAS 1.26:166474) Avail: NTIS HC A02/MF A01 CSCL 05I

The effect of automation in the cockpit on changing the task of the pilot and effecting his performance is examined. N.W.

N84-17839# Georgia Inst. of Tech., Atlanta. School of Psychology.
VISUAL CUES IN THE SIMULATION OF LOW-LEVEL FLIGHT Final Report, 1 Apr. 1982 - 31 Mar. 1983
E. J. Rinalducci 31 May 1983 31 p
(Grant AF-AFOSR-0144-82; AF Proj. 2313)
(AD-A135461; AFOSR-83-1016TR) Avail: NTIS HC A03/MF A01 CSCL 05/8

The research described in this report was directed towards a continued examination of visual cues used by pilots to maintain altitude in low level flight simulation. The first study investigated the use of a psychophysical technique to provide a quick, low-cost evaluation of altitude cues provided by five visual display system conditions in which terrain features were varied in detail, density, and vertical development. Both pilot and non-pilot observers were employed. A second study examined three visual display environments (i.e., a valley floor, a valley floor with walls, and a valley floor with walls and inverted pyramids) using different display modes (i.e., slides, static video, and dynamic video). Differences between pilot and non-pilot subjects were obtained for the accuracy of altitude estimation. GRA

N84-17840# Pittsburgh Univ., Pa. Learning Research and Development Center.
PROBLEM SOLVING ABILITIES
M. T. H. Chi 5 Oct. 1983 47 p
(Contract N00014-79-C-0215)
(AD-A134717; AD-E301247; UPITT/LRDC/ONR/KBC-8) Avail: NTIS HC A03/MF A01 CSCL 05/10

This report provides a general and brief introduction to the current state of our understanding of human problem solving. Over the years, psychologists have learned a lot about the nature of the problem solving process. The importance of the initial representation of a problem was discovered quite a few years ago by the Gestalt School in its examination of insight problems. The actual nature of initial representations and their influence on problem solving was made clear only in the last couple of decades, however, when the notion of a solution space was developed. There was a time, not too long ago, when researchers, especially those in artificial intelligence, thought that effective problem solving might be due mainly to general strategies for guiding search through

problem spaces. Early attempts to create computer programs to solve problems, such as the General Problem Solver, took this approach. However, this straightforward picture of problem solving has recently been shown to be far too simple. Specific knowledge of a domain is of overriding importance in the effective solution of problems. In addition, this knowledge must be well-structured so that relevant knowledge can be accessed at the proper time. Research is beginning to uncover just what well-structured means, but considerable work is left to be done on the problem of how we are able to retrieve and use information in a rapid and effective manner. GRA

N84-17841# Colorado Univ., Boulder. Center for Research on Judgement and Policy.
TASK CONDITIONS VERSUS STABLE INDIVIDUAL DIFFERENCES AS DETERMINANTS OF EXPERTS' JUDGEMENT POLICIES
R. M. Hamm Sep. 1983 37 p
(Contract N00014-81-C-0591)
(AD-A134797; AD-F630168; CRJP-249) Avail: NTIS HC A03/MF A01 CSCL 05/10

An analysis of twenty-one highway experts' judgments of the safety of a set of highways, under three different task conditions, was undertaken to determine whether task conditions or stable individual differences in judgment policy had the stronger role in determining the experts' judgment performances. Two analytical approaches were used: comparing the correlations among performances within each individual expert over the different task conditions, and within each task over the different experts, and clustering the performances and inspecting whether clusters were made up primarily of performances from the same individuals or from the same task conditions. While the approach of comparing correlations of performances gave ambiguous results, the clustering approach clearly indicated that task condition, not stable individual judgment policy, determines similarities among judgment performances. Author (GRA)

N84-17842# University of Southern California, Los Angeles. Center for Effective Organizations.
MOTIVATION AND PERFORMANCE APPRAISAL BEHAVIOR
Allan M. Mohrman, Jr. and Edward E. Lawler, III 1981 34 p
(Contract N00014-81-K-0048)
(AD-A134311; G-81-12(19); Rept-14) Avail: NTIS HC A03/MF A01 CSCL 05/10

This paper is concerned with what motivates the behavior involved in carrying out performance appraisals (PA) in organizations. Typically, research and theory concerned with motivation has focused on how PA effects the subsequent work behavior of the appraisee; here we will focus on what motivates the PA behaviors themselves. Conducting a PA involves a set of behaviors performed by organizational members. As such, PA behaviors are simply one subset of the total set of role behaviors they perform. Thus, they can be analyzed as any other organizational behavior. PA behavior is a particularly interesting and important type of behavior to study. The particular purposes of PA create contexts that give PA behaviors unique and complex meanings that are worthy of study for what they can teach us about motivation and assessment. In addition, as we come to understand more about the results of certain PA behaviors (such as allowing participation in the process by appraisees) and as we become more concerned with the quality of PA behaviors (e.g., bias in measurement), we also need to be more concerned about what motivates such behaviors so they can be managed. Seeking to manage performance behaviors through PA will come to nought unless these PA behaviors themselves can be managed. GRA

N84-17843# Hershey (Milton S.) Medical Center, Hershey, Pa. Dept. of Behavioral Science.
COGNITION AND AROUSAL AS PREDICTORS OF RISK TAKING: EFFECTS OF LOAD AND COGNITIVE STYLE
Siegfried Streufert Aug. 1983 26 p
(Contract N00014-80-C-0581)
(AD-A134324; TR-15-ONR) Avail: NTIS HC A03/MF A01 CSCL 05/10

The research investigated the contributions of three cognitive styles (Type A, Cognitive Complexity and the General Incongruity Adaptation Level - GIAL) on risk taking in a visual motor task. The research was further concerned with uncovering possible relationship between these cognitive styles and physiological (cardiovascular) arousal as sources of risky action. Effects of stylistic variables on risk taking appeared frequently at specific task load levels. Only limited relationships between arousal and risk taking were obtained. Arousal did not covary meaningfully with stylistic antecedents of risky behavior. It was concluded that risk taking is primarily cognitive in orientation and interventions to decrease risk taking on the job should focus on relevant cognitive approaches. GRA

N84-17844# Hershey (Milton S.) Medical Center, Hershey, Pa. Dept. of Behavioral Science.
TASK DIFFERENCES, STYLISTIC CHARACTERISTICS AND PHYSIOLOGICAL AROUSAL
Susan C. Streufert Aug. 1983 34 p
(Contract N00014-80-C-0581)
(AD-A134335; TR-14-ONR) Avail: NTIS HC A03/MF A01 CSCL 05/10

This research was designed to determine the effects of cognitive/behavioral styles, in general, and of the General Incongruity Adaptation Level (GIAL), in particular, on physiological arousal under a variety of task conditions. It was found that load stressors in many cases produce changes in blood pressure levels which appear to parallel previous findings showing them to be related to various indices of task performance. Particularly the GIAL style (and to lesser degrees cognitive complexity and Type A, in that order) appear to mediate when load stressor effects on arousal do occur. The present research provides the basis for planned research efforts which will be concerned with potential covariation of task performance measures (such as risk taking and utilization of strategy) and physiological responsivity, as they are jointly affected by behavioral styles and task stressor (e.g., load) levels. GRA

N84-17845# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
ANALYSIS OF THE PILOT CONVERSION PROCESS FOR THE AIR FORCE T-46A JET TRAINER AIRCRAFT M.S. Thesis
V. Seth Jensen Sep. 1983 169 p
(AD-A134404; AFIT-LSSR-51-83) Avail: NTIS HC A08/MF A01 CSCL 05/9

The objective of this research was to critically evaluate a portion of the Air Training Command T-46A Implementation Master Plan dated 1 March 1983. The process of converting students and instructor pilots from T-37 to T-46A was analyzed for feasibility and sensitivity to changes in certain resources and schedules. A simple analytical approach was used, calculating and comparing flying hours required versus available for various resource situations. The basic plan, as written for Laughlin AFB, is infeasible because of a short-age of flying hours during several months. The primary causes of this imbalance are: use of partial- and no-simulator syllabi; peak flying during the Operational Readiness Assessment (ORA); and the relatively low initial T-46A utilization rate. Some options for making the plan more workable are analyzed, as is a plan to convert without additional instructor pilots. Other approaches are suggested, without analysis. Besides the actual pilot conversion, there are brief analyses and comments on acquiring additional instructor pilots, manning the ORA, and conversion at subsequent bases. The findings are based on specific assumptions which must be clearly understood. The author concludes that the basic plan can be made feasible by applying suggested modifications. Author (GRA)

N84-17846# Hershey (Milton S.) Medical Center, Hershey, Pa. Dept. of Behavioral Science.
EFFECTS OF LOAD, COGNITIVE COMPLEXITY AND TYPE A ON SATISFACTION
Siegfried Streufert, Susan C. Streufert, and Rosanne Pogash Jun.

1983 28 p
(Contract N00014-80-C-0581)
(AD-A134415; TR-ONR-13) Avail: NTIS HC A03/MF A01 CSCL 05/10

Effects of information load on satisfaction as modified by type A vs. Type B and by Cognitive Complexity were investigated. Satisfaction decreased with increasing task difficulty (load) but was particularly low for persons of Type A and cognitive simple styles. Similar results were obtained for a measure of Enjoyment Despite Dissatisfaction which accounted for motivation in the face of challenge. Relationships between job and task satisfaction are considered. Author (GRA)

N84-17847# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
PRELIMINARY FIELD TESTS FOR DETECTING FLYING TARGETS IN FRONT OF A LAND BACKGROUND [FOERBEREDANDE FAELTFOERSOEK AVSEENDE UPPTAECKT AV LUFTMAAL MOT TERRAENGBAKRUND]
Clemens Weikert Sep. 1982 22 p refs In SWEDISH
(FOA-C-56033-H2) Avail: NTIS HC A02/MF A01

Over 100 flights on 3 different tracks were observed by 5 persons using periscopes equipped with a moving target indicator. Flight heights varied from 25 to 50 m. The detection probability rate was determined: 5% for distances over 60 hm and 50% at 46 hm. High angular velocity of the target allows earlier detection. It is noted that light illumination directly towards the target is always more favorable than cross light. Effects of background luminance are reported. Author (ESA)

N84-17848# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
DETECTION OF FLYING TARGETS IN FRONT OF A LAND BACKGROUND: LABORATORY TESTS [UPPTAECKT AV LUFTMAAL MOT TERRAENGBAKRUND: LABORATORIEFOERSOEK]
Clemens Weikert Sep. 1982 18 p refs In SWEDISH
(FOA-C-56034-H2) Avail: NTIS HC A02/MF A01

Target recognition against a land background was studied using color movies observed by 60 persons, 39 of whom also observed black and white video recordings. The influence of target angular velocity and light incidence were studied. Results show that the higher the target angular velocity is, the earlier detection occurs; better detection performances are noted with an oblique light incidence than with the light towards the observer, which in turn gives better performances than cross-light. For target approaches recorded on video tapes, only light incidence is conclusive, cross-light giving the best results. This is not in accordance with color film tests and ground observations, due probably to contrast differences between the black and white video images and color perception. Author (ESA)

N84-17849# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
DETECTION OF FLYING TARGETS IN FRONT OF A LAND BACKGROUND: FIELD TESTS [UPPTAECKT AV LUFTMAAL MOT TERRAENGBAKGRUND: FAELTOERSOEK]
Clemens Weikert Sep. 1982 35 p refs In SWEDISH
(FOA-C-56035-H2) Avail: NTIS HC A03/MF A01

The influence of the target type, angular velocity, illumination, and visibility conditions on visual detection of flying targets against a land background was studied. Sixteen observers made 162 determinations with 18 different combinations of target type, angular velocity, and light incidence. Three types of aircrafts were used. Mean detection distance is 101.6 hm. The probability rate of detection before a 60 hm approach is 85%, 91%, and 99% depending on the aircraft type, and a 50% detection rate is noted at distances of 90, 103, and 111 hm. Author (ESA)

N84-17850# California Univ., Irvine. Dept. of Pulmonary and Critical Care Medicine.
BEHAVIORAL CHANGE OF BLOOD LACTATE METABOLISM Final Report
Archie F. Wilson Dec. 1982 74 p refs
(Contract PHS-MH-29791)
(PB84-100171; NIMH-83-333) Avail: NTIS HC A04/MF A01 CSCL 05J

Possible cellular contributions to behavioral alteration of glycolytic rate in the state of transcendental meditation (TM) were investigated. Specifically, the study was undertaken to: (1) confirm preliminary experiments which indicated that the rate of lactate generation by formed elements of blood may be affected by a relaxed behavioral state; (2)investigate the effect of other common forms of rest/relation states; (3) ascertain whether the effects on generation associated with rest of TM are due to sleep that may occur; (4) investigate more precisely the origin and mechanism of altered blood glycolysis; (5) study the interrelationship between the primary outcome variable of altered blood glycolysis; and (6) study possible contribution of personality variables to outcome. GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N84-17851 California Univ., Davis.
KINEMATICS AND DYNAMICS OF MULTI-RIGID-BODY OPEN-CHAIN SYSTEMS: APPLICATION TO ROBOT MANIPULATORS Ph.D. Thesis
Gordon Robert Pennock 1982 229 p
Avail: Univ. Microfilms Order No. DA8326100

This dissertation is a study of the kinematics and dynamics of multi-rigid-body open-chain systems, in particular, robot manipulators. The kinematics part of this work focuses on the continuous motion and the instantaneous motion of these systems. Using dual-transformation matrices and the Principle of Transference a systematic procedure is established to solve the positioning problem of a robot manipulatory. Analytical expressions are also derived for the differential changes in position and orientation of the end-effector of the manipulator in terms of the differential changes in the joint coordinates. In this study of the instantaneous kinematics of multi-rigid-body open-chain systems the instantaneous kinematics is presented for two-degree-of-freedom and three-degree-of-freedom rigid-body motions. Using dual-numbers and screw calculus, a systematic procedure is established for the determination of canonical corrdinate frames and the locii of the absolute instantaneous screw axes of the terminal links.
Dissert. Abstr.

N84-17852*# Georgia Inst. of Tech., Atlanta.
INORGANIC ANALYSIS IN A CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM Final Report, Mar. 1982 - Jun. 1983
John L. Carden and Richard F. Browner Jun. 1983 21 p ref
(Grant NAG2-170)
(NASA-CR-173299; NAS 1.26:173299) Avail: NTIS HC A02/MF A01 CSCL 06K

Techniques useful for the elemental analysis of samples of types which might require analysis within a controlled ecological life support system are investigated. For individual titles, see N84-17853 through N84-17854.

N84-17853*# Georgia Inst. of Tech., Atlanta.
[TECHNIQUES FOR THE INORGANIC ANALYSIS IN A CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM] Final Report c51
In its Inorgan. Anal. in a Controlled Ecol. Life Support System Jun. 1983 12 p (For primary document see N84-17852 08-54)
Avail: NTIS HC A02/MF A01 CSCL 06K

Sample preparation, instrumental analysis, a direct injection device for IC/ICP interfacing, a hydraulic jet bend impaction device, monodisperse aerosol generator, and low gravity environments are discussed. N.W.

N84-17854*# Georgia Inst. of Tech., Atlanta.
STANDARD RESEARCH MATERIALS: FECES AND URINE Final Report **c51**
In its Inorg. Anal. in a Controlled Ecol. Life Support System Jun. 1983 9 p ref (For primary document see N84-17852 08-54)
Avail: NTIS HC A02/MF A01 CSCL 06P

Preparation of the standard research materials, preparation of the samples for analysis, elemental analysis, composition of standard research materials, and methodology are discussed.
N.W.

N84-17855*# Life Systems, Inc., Cleveland, Ohio.
ADVANCED AIR REVITALIZATION SYSTEM TESTING Final Report
D. B. Heppner, T. M. Hallick, and F. H. Schubert Jun. 1983 77 p refs
(Contract NAS2-10961)
(NASA-CR-166540; NAS 1.26:166540; LSI-TR-406-4) Avail: NTIS HC A05/MF A01 CSCL 06K

A previously developed experimental air revitalization system was tested cyclically and parametrically. One-button startup without manual interventions; extension by 1350 hours of tests with the system; capability for varying process air carbon dioxide partial pressure and humidity and coolant source for simulation of realistic space vehicle interfaces; dynamic system performance response on the interaction of the electrochemical depolarized carbon dioxide concentrator, the Sabatier carbon dioxide reduction subsystem, and the static feed water electrolysis oxygen generation subsystem, the carbon dioxide concentrator module with unitized core technology for the liquid cooled cell; and a preliminary design for a regenerative air revitalization system for the space station are discussed.
Author

N84-17856*# Life Systems, Inc., Cleveland, Ohio.
STATIC FEED WATER ELECTROLYSIS SUBSYSTEM TESTING AND COMPONENT DEVELOPMENT Final Report
E. P. Koszenski, F. H. Schubert, and K. A. Burke Sep. 1983 91 p refs
(Contract NAS2-11087)
(NASA-CR-166539; NAS 1.26:166539; LSI-TR-481-4) Avail: NTIS HC A05/MF A01 CSCL 06K

A program was carried out to develop and test advanced electrochemical cells/modules and critical electromechanical components for a static feed (alkaline electrolyte) water electrolysis oxygen generation subsystem. The accomplishments were refurbishment of a previously developed subsystem and successful demonstration for a total of 2980 hours of normal operation; achievement of sustained one-person level oxygen generation performance with state-of-the-art cell voltages averaging 1.61 V at 191 ASF for an operating temperature of 128F (equivalent to 1.51V when normalized to 180F); endurance testing and demonstration of reliable performance of the three-fluid pressure controller for 8650 hours; design and development of a fluid control assembly for this subsystem and demonstration of its performance; development and demonstration at the single cell and module levels of a unitized core composite cell that provides expanded differential pressure tolerance capability; fabrication and evaluation of a feed water electrolyte electrolysis five-cell module; and successful demonstration of an electrolysis module pressurization technique that can be used in place of nitrogen gas during the standby mode of operation to maintain system pressure and differential pressures.
Author

N84-17857*# Life Systems, Inc., Cleveland, Ohio.
ELECTROCHEMICAL CARBON DIOXIDE CONCENTRATOR SUBSYSTEM DEVELOPMENT Final Report
D. B. Heppner, M. J. Dahlausen, and F. H. Schubert Nov. 1983 73 p refs
(Contract NAS2-11129)
(NASA-CR-166538; NAS 1.26:166538; LSI-TR-482-4) Avail: NTIS HC A04/MF A01 CSCL 06K

The fabrication of a one-person Electrochemical Depolarized Carbon Dioxide Concentrator subsystem incorporating advanced electrochemical, mechanical, and control and monitor instrumentation concepts is discussed. This subsystem included an advanced liquid cooled unitized core composite cell module and integrated electromechanical components. Over 1800 hours with the subsystem with removal efficiencies between 90%. and 100%; endurance tests with a Fluid Control Assembly which integrates 11 gas handling components of the subsystem; and endurance testing of a coolant control assembly which integrates a coolant pump, diverter valve and a liquid accumulator were completed.
Author

N84-17858*# Purdue Univ., Lafayette, Ind. Dept. of Psychological Sciences.
OBJECTIVE MEASURE OF PILOT WORKLOAD Annual Progress Report, Jan. - Dec. 1983
Barry H. Kantowitz 1984 93 p refs
(Contract NCC2-235)
(NASA-CR-173296; NAS 1.26:173296; APR-2) Avail: NTIS HC A05/MF A01 CSCL 05H

Timesharing behavior in a data-entry task, similar to a pilot entering navigation data into an on-board computer is investigated. Auditory reaction time as a function of stimulus information and dimensionality is examined. This study has direct implications for stimulus selection for secondary tasks used in the GAT flight simulator at Ames Research Center. Attenuation effects of heat and cold stress in a psychological refractory period task were studied. The focus of interest is the general effects of stress on attention rather than upon specific temperature related phenomena.
Author

N84-17859*# Behavioral Inst. for Technology and Science, Inc., West Lafayette, Ind.
A THEORETICAL APPROACH TO MEASURING PILOT WORKLOAD Annual Progress Report, Jan. - Dec. 1983
Barry H. Kantowitz 1984 113 p refs
(Contract NCC2-228)
(NASA-CR-173297; NAS 1.26:173297; APR-2) Avail: NTIS HC A06/MF A01 CSCL 05H

Theoretical assumptions used by researchers in the area of attention, with emphasis upon errors and inconsistent assumptions used by some researchers were studied. Two GAT experiments, two laboratory studies and one field experiment were conducted.
N.W.

N84-17860# Army Aeronautical Research Lab., Moffett Field, Calif.
IMPACT RESPONSE OF AN ENERGY ABSORBING EARCUP
D. F. Shanahan Sep. 1983 47 p
(AF Proj. 3M1-61102-BS-10)
(AD-A134828; USAARL-83-14) Avail: NTIS HC A03/MF A01 CSCL 06/17

Twelve impact tests on instrumented human cadavers were performed at Wayne State University to compare the load attenuating capability of an energy absorbing earcup with that of the standard rigid earcup used in SPH-4 flight helmets. SPH-4 helmeted cadavers were dropped from heights varying from 1.17 to 2.03 m. so as to receive a direct impact to the right side of the helmet. The helmet was equipped with either standard or energy absorbing earcups. Loads were measured at the impact surface and accelerations were measured through a triaxial accelerometer mounted to the cadaver's maxilla. Analysis of the data shows a significant decrease in both peak load and acceleration in the y axis for the energy absorbing earcup equipped helmets over those measured for the standard earcup equipped helmets.
GRA

N84-17861# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
AN OPTICAL PROXIMITY SENSOR FOR MEASURING SURFACE POSITION AND ORIENTATION FOR ROBOT MANIPULATION Interim Report
T. Kanade and T. M. Sommer 5 Sep. 1983 30 p
(Contract N00014-81-K-0503)
(AD-A134899; CMU-RI-TR-83-15) Avail: NTIS HC A03/MF A01

CSCL 17/8

The authors developed a noncontact proximity sensor which can measure the distance and orientation of a surface in a range of four to five centimeters. The sensor is based on the scheme of active illumination and triangulation. It uses multiple infrared LEDs (light emitting diodes) as the light sources and a PIN-diode area sensor chip for detecting the spot positions. Six LEDs with optics for collimating the beam are mounted at the sensor head. The directions of the beams are aligned to form a cone of light converging at a distance of 4.5 cm from the sensor head. As each LED is sequentially pulsed, the sensor chip detects the position, in its field of view, of the spot projected by the LED light beam on the object surface. The 3-D location of the spot on the surface can be computed by triangulation. By doing this for six LEDs a set of six 3-D points is obtained. Then by fitting a plane to those points, the distance and orientation of a small portion of the object surface are calculated. Since there is no moving part and the spot position sensor chip is an analog sensor which outputs the position of the spot directly without scanning its field of view, fast operation of the proximity sensor can be realized. Currently the sensor can give approximately 1000 measurements of distance and orientation per second with precision of 0.07 mm for distance and 1.5 deg for surface orientation. This non-contact proximity sensor will be useful for such applications as tracing an object surface by a robot arm with specified distance and orientation relative to the surface. Author (GRA)

N84-17862# Bendix Corp., Kansas City, Mo.
MEASUREMENT OF ROBOT ACCURACY USING THE LATIN SQUARE THREE-DIMENSIONAL BALL PLATE
J. R. Lembke and L. L. Jones Nov. 1983 45 p refs
(Contract DE-AC04-76DP-00613)
(DE84-004920; BDX-613-2992) Avail: NTIS HC A03/MF A01

A Latin square three dimensional ball plate (LSBP) was used to characterize the accuracy of a robot. The robot was programmed to partially automate the measurement process. The robot's precision was in the expected range; its accuracy, however, was significantly worse than expected. DOE

N84-17863# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
MAN AND MACHINE. THE ROLE OF HUMAN FACTORS IN SYSTEM DEVELOPMENT
Hans Furustig Jul. 1983 81 p refs In SWEDISH; ENGLISH summary
(FOA-A-56005-H2; ISSN-0281-0239) Avail: NTIS HC A05/MF A01

Human factors (hf) in system development are reviewed. Conventional hf increases personnel safety and comfort, and improves hardware design. System oriented hf facilitates directing hf efforts to the most urgent areas and relates hf recommendations to system effects. Case studies and examples show what happens if hf recommendations are not followed. Qualities of the system development, judgement, and decision making processes are discussed. Conditions within system developing organizations are treated: predominance of method knowledge and perspective, role conflicts, irrationality, restrictions on action, and communication barriers. Problems in hf work are discussed: data relevance, qualities of hf system approach, and difficulties during knowledge transfer. Aspects improving hf specialists' work are: operative knowledge, organizational knowledge, specialist status, management support, praxis, and the need to evaluate and support research. Author (ESA)

N84-17864# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
PROTECTION AGAINST HEAT RADIATION IN THE STEEL INDUSTRY
Lars Gustavsson 30 Jun. 1983 33 p refs In SWEDISH; ENGLISH summary Sponsored by Swedish Work Environment Fund
(FOA-C-20500-E4; ISSN-0347-3694) Avail: NTIS HC A03/MF A01; Research Inst. of National Defence, Stockholm KR 25

A visor with good visual transparence, and giving a high heat radiation attenuation was developed as a prototype and was received very well at tests on work places in the steel industry. It is scratch resistant. This 1 mm thick polycarbonate visor, the outer face of which is covered with a thin gold coating, reduces the thermal radiation 300 times from a steel melting at 1600 C, and allows a visual transmission of 13% Author (ESA)

N84-17865# Pennsylvania State Univ., University Park.
ELECTRICAL-SHOCK PREVENTION. VOLUME 1: PROTECTION OF MAINTENANCE PERSONNEL Open File Report, 6 Apr. 1981 - 8 Dec. 1982
L. A. Morley, T. Novak, and F. C. Trutt 8 Dec. 1982 127 p refs 4 Vol.
(Contract DE-BM-J0-113009)
(PB84-102946; BM-OFR-177(1)-83) Avail: NTIS HC A07/MF A01 CSCL 08I

The overall objective of this research was to investigate the application, economic, and safety considerations of electrical-shock prevention techniques applied to surface and underground mines. volume 1 of this four-volume report is primarily concerned with the protection of maintenance personnel. The scope of the work is specified, electrical shock is defined, and needed ground-fault relay characteristics to prevent ventricular fibrillation are established. This is followed by an analysis of ac systems, a comparison of these systems with respect to body currents, the advantages and disadvantages of the various ground-fault protection techniques, and an analysis of dc systems for off-track vehicles. Summaries and synopses of each of the three remaining volumes are included. GRA

N84-17866# Pennsylvania State Univ., University Park.
ELECTRICAL-SHOCK PREVENTION. VOLUME 2: GROUND-FAULT !NTERRUPTING DEVICES Open File Report, 6 Apr. 1981 - 8 Dec. 1982
L. A. Morley, F. C. Trutt, and D. J. Rufft 8 Dec. 1982 110 p refs 4 Vol.
(Contract DI-BM-J0-113009)
(PB84-102953; BM-OFR-177(2)-83) Avail: NTIS HC A06/MF A01 CSCL 08I

Volume 2 of this report is concerned with the application of sensitive ground-fault interrupters (GFI's) to ac utilization circuits in U.S. mines. The main concepts examined are shock prevention and methods to reduce nuisance tripping. The research involved a literature search, input from previous Bureau of Mines contracts, and contacts with electrical manufacturers and mining personnel. Several devices that showed promise were tested and the results indicate the existence of GFI's that may be modified to perform adequately on U.S. mining systems. A set of guidelines covering design, construction specification, and performance tests is included. GRA

N84-17867# Pennsylvania State Univ., University Park.
ELECTRICAL-SHOCK PREVENTION. VOLUME 3: FAULT PROTECTION FOR MOTION-DRIVE EQUIPMENT Open File Report, 6 Apr. 1981 - 8 Dec. 1982
L. A. Morley, F. C. Trutt, and G. M. Buchan 8 Dec. 1982 65 p refs 4 Vol.
(Contract DI-BM-J0-113009)
(PB84-102961; BM-OFR-177(3)-83) Avail: NTIS HC A04/MF A01 CSCL 08I

Volume 3 of the report examines the indication versus interruption procedures used on motion-drive power equipment with emphasis on surface excavators. A review of the electromechanical ac-dc conversion used with the Ward-Leonard control system is presented. Protection for the drive-system components are then discussed. Fault sources and calculations for both the ac supply source and dc power loop are introduced to assist in discussing indication and interruption procedures. The dynamic process of the machine is examined and the effects of fault current and position of the machine to allow for an orderly shutdown is determine. Possible indication and interruption porcedures are given for the four-quadrant duty cycle of excavators. The report is

concluded by introducing other mining operations that utilize similar motion-drive systems and static (solid-state) drives. GRA

N84-17868# Pennsylvania State Univ., University Park.
ELECTRICAL-SHOCK PREVENTION. VOLUME 4: OVERHEAD-LINE CONTACT FATALITIES Open File Report, 6 Apr. 1981 - 8 Dec. 1982
L. A. Morley, F. C. Trutt, and G. T. Homce 8 Dec. 1982 116 p refs 4 Vol.
(Contract DI-BM-J0-113009)
(PB84-102979; BM-OFR-177(4)-83) Avail: NTIS HC A06/MF A01 CSCL 08I

Volume 4 of the report examines the problem of indirect contact of overhead high-voltage powerlines by mining personnel. This refers to the contact of energized lines by workers through an intermediate conductor such as a metallic tool or a piece of high-reaching mobile equipment. The shock hazad by such contact has been a major cause of electrical fatalities associated with mining operations. The report is divided into three areas. The first gives a general background of overhead lines, basic characteristics, and associated hazards and describes presently used techniques and devices that attempt to alleviate the contact problem. The second area presents a detailed analysis of 39 overhead-line contact accidents in mining since 1970. The third section used the information in the first two areas to formulate recommendations to prevent these accidents. GRA

N84-17869# West Virginia Univ., Morgantown. Dept. of Electrical Engineering.
ANALYSIS OF ELECTRICAL ACCIDENT PREVENTION COUNTERMEASURES Open File Report, 30 Sep. 1981 - 29 Nov. 1982
W. L. Cooley, W. Collins, Z. Elrazaz, R. Kumar, R. McConnell, and M. Jerabek 31 Dec. 1982 359 p refs
(PB84-102987; BM-OFR-179-83) Avail: NTIS HC A16/MF A01 CSCL 08I

The report provides a detailed analysis of 23 electrical accident countermeasures contemplated for use in the metal-nonmetal mining industry. The costs and potential benefits of implementing groups of countermeasures are estimated and methods are outlined by which countermeasures can be selected in an effective manner. The analysis is based largely on an extensive electrical accident event tree which is developed in detail. For those countermeasures that are not currently technically feasible, several prototype devices were developed to help speed development. These included a trolley arc eliminator and a safe mine electrician's multimeter. GRA

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N84-17870 Utah Univ., Salt Lake City.
CONSTRAINT DRIVEN SYNTHESIS OF HARDWARE DESIGN Ph.D. Thesis
David Gus Matty 1983 108 p
Avail: Univ. Microfilms Order No. DA8325644

A Constraint Driven Synthesis (CDS) system is presented which attempts to overcome the disadvantages of design synthesis methods by utilizing constraints at all stages in the design process, concentrating efficiency decisions in the structual design layer, and by not imbedding architectural biases into the model. The CDS system provides means for the description, simulation, and synthesis of hardware designs. A hierarchical hardware description language, called MOD, features a module construct which contains three distinct specifications for behavior, structure, and constraints. A MOD interpreter performs type checking on a MOD program and then performs simulation by generating and executing a LISP program from the MOD source program. The synthesizer is a decomposable production system consisting of database, rules, and control strategy. The database is a frame representation of a specially developed internal form, which resembles a one level conditional assignment. The rules are user-extensible transformations which perform queries and manipulations on the database. The control strategy utilizes a hierarchy of efficiency measures to guide the selection of transformations which restructure and partition module behaviors until all modules can be mapped into members of a selected primitive set. Dissert. Abstr.

N84-17871 Elliott-Automation Space and Advanced Military Systems Ltd., Frimley (England).
EASAMS ARCHITECTURE FOR MANAGEMENT AND CONTROL SYSTEMS
R. L. Lovelock Jun. 1983 20 p Presented at GEC Corporate Exhibition and Symp., Frimley, England
Copyright. Avail: Issuing Activity

A man-machine interface color visual display system is described. The system features touch sensitive screens; changing information presented on detailed background maps; and facilities for exploiting digital terrain data, such as production of perspective views, terrain cross section, and terrain masking diagrams. Over 4000 combinations of red, blue and green are possible, with up to 256 colors displayed at a time. Applications include air traffic control and crisis management. Author (ESA)

N84-17872 Elliott-Automation Space and Advanced Military Systems Ltd., Frimley (England).
ATE, ATLAS AND THE MICROPROCESSOR
S. J. Cherry Jun. 1983 29 p Presented at GEC Corporate Exhibition and Symp., Frimley, England
Copyright. Avail: Issuing Activity

The cost effectiveness of ATLAS and the application of ATE are discussed. Provision of ATLAS can be expensive, particularly when a large amount of rework is necessary, and the use of ATE to test unsuitable units under test (UUT) questions the validity of a general ATE solution. However, if initial analysis techniques are used together with a microprocessor-based ATLAS working station, ATLAS writing should be little more expensive than writing in free range English and correct allocation of UUTs to ATE or MTE is established. Author (ESA)

N84-17873# Mathematisch Centrum, Amsterdam (Netherlands).
FOUNDATIONS OF COMPUTER SCIENCE 4. DISTRIBUTED SYSTEMS. PART 1: ALGORITHMS AND COMPLEXITY
J. W. deBakker, ed. and J. vanLeeuwen, ed. 1983 137 p refs
(Math-Centre-Tracts-158-Pt-1; ISBN-90-6196-254-4) Avail: NTIS HC A07/MF A01

Distributed computing, parallel computation, design and complexity of VLSI algorithms, systolic computation and VLSI, algorithms and graphics are considered. For individual titles, see N84-17874 through N84-17878.

N84-17874# Utrecht State Univ. (Netherlands).
DISTRIBUTED COMPUTING
J. vanLeeuwen *In* Mathematisch Centrum Found. of Computer Sci. 4. Distributed Systems. Part 1: Algorithms and Complexity 1983 p 1-34 refs 2 Vol. (For primary document see N84-17873 08-60)
Avail: NTIS HC A07/MF A01

Distributed architectures are steadily advancing and will eventually replace conventional computer designs built around a single central processor. The trends in the theoretical investigation of the problems that arise in distributed information processing are described. Most computer systems today can be regarded as distributed systems in certain respects. Only in recent years the impetus from VLSI-technology (in the small) and local and wide area networks (in the large) has added further to the significance of distributed processing, as a viable alternative to the physical limitations of even the largest single processor systems and the inordinate investments that they require. With hardware costs declining and commercially supported interconnection technologies now available it might be more economical indeed to achieve high performance by utilizing dedicated computing units working independently in parallel, rather than through the use of extremely complex high speed single components. In many ways though, distribution seems to create more problems than it solves. Some of the insights in distributed computing that have emerged in the past decade or so are surveyed. Author

N84-17875# Harvard Univ., Cambridge, Mass.
PARALLEL COMPUTATION
L. G. Valiant *In* Mathematisch Centrum Found. of Computer Sci. 4. Distributed Systems. Part 1: Algorithms and Complexity 1983 p 35-48 refs 2 Vol. (For primary document see N84-17873 08-60)
Avail: NTIS HC A07/MF A01

In addition to the engineering considerations there are also some theoretical issues whose resolution is likely to contribute to future computing practice. The classes of problems that are amenable to fast parallel computation and computer architectures that can exploit the inherent parallelism in all problems reasonably efficiently are considered. N.W.

N84-17876# INRIA, Rocquencourt (France).
DESIGN AND COMPLEXITY OF VLSI ALGORITHMS
G. M. Baudet *In* Mathematisch Centrum Found. of Computer Sci. 4. Distributed Systems. Part 1: Algorithms and Complexity 1983 p 49-74 refs 2 Vol. (For primary document see N84-17873 08-60)
Avail: NTIS HC A07/MF A01

A computational model for VLSI is developed. Models proposed in the literature are discussed. Direct consequences from the model are derived. An initial Lemma is established. A general lower bound on the class transitive functions (such as binary multiplication, shift, convolution, etc.) is established. Another lower bound on functions like binary addition, prefix computation, etc. is developed. Circuit designs are presented to show that the lower bounds can actually be achieved; they also illustrate a very important design methodology based on the use of divide and conquer and of recursive design. N.W.

N84-17877# Utrecht State Univ. (Netherlands).
SYSTOLIC COMPUTATION AND VLSI
M. R. Kramer and J. vanLeeuwen *In* Mathematisch Centrum Found. of Computer Sci. 4. Distributed Systems. Part 1: Algorithms and Complexity 1983 p 75-103 refs 2 Vol. (For primary document see N84-17873 08-60)
Avail: NTIS HC A07/MF A01

The notion of systolic computation is due to H.T. Kung and C.E. Leiserson. The computation by means of a network of simple processing elements that rhythmically act on regular streams of data passing through the system is described. The paradigms of systolic algorithm design through a discussion of systolic queues, stacks and trees are explained. An integral approach is given to matching problems and matrix multiplication performed by (2 dimensional) systolic arrays. As a novel contribution a systolic algorithm for inverting a nonsingular n x n matrix in 0(n) time is prevented. Author

N84-17878# Princeton Univ., N. J.
VLSI, ALGORITHMS AND GRAPHICS
D. P. Dobkin *In* Mathematisch Centrum Found. of Computer Sci. 4. Distributed Systems. Part 1: Algorithms and Complexity 1983 p 105-122 refs 2 Vol. (For primary document see N84-17873 08-60)
Avail: NTIS HC A07/MF A01

Practical and theoretical aspects of the VLSI design process are discussed. The technology is described, algorithms for design automation are considered and details of two actual designs are presented. Author

N84-17879# Mathematisch Centrum, Amsterdam (Netherlands).
FOUNDATIONS OF COMPUTER SCIENCE 4. DISTRIBUTED SYSTEMS. PART 2: SEMANTICS AND LOGIC
J. W. deBakker, ed. and J. vanLeeuwen, ed. 1983 266 p refs (Math-Centre-Tracts-159-Pt-2; ISBN-90-6196-255-2) Avail: NTIS HC A12/MF A01

The problems involved in semantics and language concepts are discussed. Parallel processing and program verification are also examined. A proof system based on temporal logic is presented for proving properties of concurrent programs based on the shared-variables computation model. For individual titles, see N84-17880 through N84-17884.

N84-17880# Technische Hogeschool, Eindhoven (Netherlands).
PARTIALLY ORDERED COMPUTATIONS WITH APPLICATIONS TO VLSI DESIGN
M. Rem *In* Mathematisch Centrum Found. of Computer Sci. 4. Distributed Systems. Part 2: Semantics and Logic 1983 p 1-44 refs 2 Vol. (For primary document see N84-17879 08-60)
Avail: NTIS HC A12/MF A01

A problem that permeates all of computing science is complexity bridling. Uncontrolled concurrency causes uncontrolled complexity, even for moderately sized components. The well-known technique for avoiding complexity consists in partitioning the components into subcomponents. The whole component thus exhibits a tree structure. Such tree-structured components are known as hierarchical components. A hierarchical design method not only helps to avoid complexity, it also alleviates some of the problems. A component may be looked upon as a graph: the transistors (and the pads) are the vertices, and the connections the edges. Hierarchical components give rise to tree-like graphs. Tree-like graphs may, consequently, alleviate the layout problem. A tree is the graph that has the fewest edges while still being connected. Confinement to tree-like graphs seems thus to result in circuits that satisfy VLSI's property of limited connectivity. Author

N84-17881# Mathematisch Centrum, Amsterdam (Netherlands).
PROCESSES AND THE DENOTATIONAL SEMANTICS OF CONCURRENCY
J. W. deBakker and J. I. Zucker (State Univ. of New York, Buffalo) *In its* Found. of Computer Sci. 4. Distributed Systems. Part 2: Semantics and Logic 1983 p 45-100 refs 2 Vol. (For primary document see N84-17879 08-60)
Avail: NTIS HC A12/MF A01

A mathematical study of the semantics of a variety of language concepts in the area of concurrency is presented. Three fundamental notions are presented: parallel composition, synchronization, and communication. A general framework in which definitions and properties of these notions are discussed in a systematic way is present. The emphasis is on definitions rather than on pragmatic use of language concepts. Author

N84-17882# Paris Univ. (France).
TEN YEARS OF HOARE'S LOGIC, A SURVEY. PART 2: NONDETERMINISM
K. R. Apt *In* Mathematisch Centrum Found. of Computer Sci. 4. Distributed Systems. Part 2: Semantics and Logic 1983 p 101-132 refs 2 Vol. (For primary document see N84-17879 08-60)
Avail: NTIS HC A12/MF A01

A survey of various results concerning the use of Hoare's logic in proving correctness of nondeterministic programs is presented. Various proof systems together with the example proofs are given and the corresponding soundness and completeness proofs of the systems are discussed. Programs allowing bounded and countable nondeterminism are studied. Proof systems deal with partial and total correctness, freedom of failure and the issue of fairness. Author

N84-17883# Warwick Univ. Coventry (England).
THE FAIRNESS PROBLEM AND NONDETERMINISTIC COMPUTING NETWORKS
D. Park *In* Matematische Centrum Found. of Computer Sci. 4. Distributed Systems. Part 2: Semantics and Logic 1983 p 133-161 refs 2 Vol. (For primary document see N84-17879 08-60)
Avail: NTIS HC A12/MF A01

The existence of a fairness problem was recognized. It accounts for the most important respect in which the formal description of programming languages involving parallelism is expected to be inadequate. Relative timing must be known otherwise what is computed is nondeterministic, so that networks involving such components are regarded as computing relations rather than functions. The precise times which computations and transmissions of messages take are often left unspecified. A mathematical analysis of such networks must introduce some timelike features, and detracts from the abstractness of the model used. Serious anomalies, which prevents naive extension of ideas which work well for deterministic networks are examined. A reasonable way to cope with these problems, while remaining as abstract as possible was sought. The result is an extended kahn principle for networks composed of nondeterministic merge nodes as well as arbitrary deterministic nodes. Author

N84-17884# Stanford Univ., Calif. Dept. of Computer Science.
VERIFICATION OF CONCURRENT PROGRAMS: A TEMPORAL PROOF SYSTEM
Zohar Manna and Amir Pnueli (Weizmann Inst. of Science) *In* Mathematisch Centrum Found. of Computer Sci. 4. Distributed Systems. Part 2: Semantics and Logic 1983 p 163-255 refs Previously announced as N84-10801 2 Vol. (For primary document see N84-17879 08-60)
Avail: NTIS HC A12/MF A01

A proof system based on temporal logic is presented for proving properties of concurrent programs based on the shared-variables computation model. The system consists of three parts: the general uninterpreted part, the domain dependent part and the program dependent part. In the general part we give a complete proof system for first-order temporal logic with detailed proofs of useful theorems. This logic enables reasoning about general time sequences. The domain dependent part characterizes the special properties of the domain over which the program operates. The program dependent part introduces axioms which restrict the time sequences considered to be excecution sequences of a given program. The utility of the full system is demonstrated by proving invariance, liveness and precedence properties of several concurrent programs. Derived proof principles for these classes of properties are obtained and lead to a compact representation of proofs. Author

N84-17885# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A RELIABILITY AND FAILURE MODE ANALYSIS OF CELESTIAL TRAINING DEVICE MICROCOMPUTERS EMPLOYED BY SAC AND MAC M.S. Thesis
G. F. Nemeyer, Jr. Sep. 1983 107 p
(AD-A135003; AFIT-LSSR-85-83) Avail: NTIS HC A06/MF A01 CSCL 09/2

Although inexpensive, desk-top microcomputers offer the promise of improving productivity in many areas, their maintenance reliability must be considered when assessing their cost-effectiveness from a life-cycle cost viewpoint. This thesis sets out to determine the reliability and frequency-of-repair of a typical microcomputer system, the Celestial Training Device (CTD), currently in the Air Force inventory. Owners of CTD systems were surveyed to determine system failure rates and which components were prone to failure. Existing repair procedures were evaluated for speed of response and, when possible, cost-effectiveness. The results of this study provide a picture of maintenance requirements for a typical microcomputer system which can be used by potential buyers of microcomputers as a basis for determining the most suitable maintenance procedure.
Author (GRA)

N84-17886# Naval Research Lab., Washington, D. C.
BERTHA: A VERSATILE TRANSMISSION LINE AND CIRCUIT CODE Final Report, 1 Jan. 1982 - 31 Dec. 1982
D. D. Hinshelwood 21 Nov. 1983 98 p
(DNA Proj. T99-QAXL)
(AD-A135024; NRL-MR-5185) Avail: NTIS HC A05/MF A01 CSCL 09/2

An improved version of the NRL transmission line code of W.H. Lupton is presented. The capabilities of the original program have been extended to allow magnetically insulated transmission lines, plasma opening switches, imploding plasma loads and discrete element electrical networks, for example, to be modeled. BERTHA can be used to simulate any system that can be represented by a configuration of transmission line elements. The electrical behavior of the system is calculated by repeatedly summing the reflected and transmitted waves at the ends of each element. This program is versatile, easy to use and easily implemented on desktop microcomputers. Author (GRA)

N84-17887# Harvard Univ., Cambridge, Mass. Dept. of Computer Science.
ON ACYCLIC DATABASE DECOMPOSITIONS
Catriel Beeri and Moshe Y. Vardi (Stanford Univ.) Jul. 1983 13 p
(Grant AF-AFOSR-0212-80; AF Proj. 2304)
(AD-A135105; SU-STAN-CS-83-976; AFOSR-83-0959TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

Given a universal relation scheme, presented as a set of attributes and a set of dependencies, it may be advantageous to decompose it into a collection of schemes, each with its own sets of attributes and dependencies, which has some desired properties. A basic requirement for such a decomposition to be useful is that the corresponding decomposition map on universal relations be injective. A central problem in database theory is to find the reconstruction map, i.e., the inverse map of an injective decomposition map. We prove here that when the decomposition, viewed as a hypergraph, is acrylic and the given dependencies are full implicational dependencies, then the reconstruction map is the natural join. Based on this, we show that there is a polynomial time algorithm to test for injectiveness of decompositions. GRA

N84-17888# Stanford Univ., Calif. Dept. of Computer Science.
EXPERIENCE WITH A REGULAR EXPRESSION COMPILER
Anna R. Karlin, Howard W. Trickey, and Jeffrey D. Ullman Jun. 1983 24 p
(Contract MDA903-80-C-0107; Grant NSF MCS-82-03405)
(AD-A135202; SU-STAN-CS-83-972) Avail: NTIS HC A02/MF A01 CSCL 09/2

The language of regular expressions is a useful one for specifying certain sequential processes at a very high level. They allow easy modification of designs for circuits, like controllers, that are described by patterns of events they must recognize and the responses they must make to those patterns. This paper discusses the compilation of such expressions into reasonably

compact layouts. The translation of regular expressions into nondeterministic automata by two different methods is discussed, along with the advantages of each method. A major part of the compilation problem is selection of good state codes for the nondeterministic automata; one successful strategy is explained in the paper. GRA

N84-17889# University of Southern California, Los Angeles. Dept. of Electrical Engineering.
AUTOMATED SYNTHESIS OF DIGITAL HARDWARE MODULES: SIMULATION AND VERIFICATION OF INTERCONNECTIONS Final Report, Sep. 1980 - Aug. 1983
A. C. Parker Oct. 1983 9 p
(Contract DAAG29-80-K-0083)
(AD-A135298; ARO-17920.13-EL) Avail: NTIS HC A02/MF A01 CSCL 09/2

The final report describes research in hardware synthesis, layout, compaction and area estimation. The most important results involve the wireability analysis for gate arrays, the derivation of Rent's rule, extensions of Hafer's register-transfer synthesis model, and the specification of a data structure to represent hardware design data for use in an expert system. Author (GRA)

N84-17890# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
ADVANCED ON-BOARD SIGNAL PROCESSOR GaAs MEMORY Final Technical Report, 21 Jan. 1981 - 21 Oct. 1982
R. Vahrenkamp, R. Zucca, and S. J. Lee Nov. 1983 117 p
(Contract MDA903-81-C-0126; DARPA Order 4100)
(AD-A135465; MRDC41083.29FTR) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report covers the first twenty-one months of the AOSP (Advanced On-Board Signal Processor) GaAs(Gallium Arsenide) Memory Program. The objective of this program is to utilize the performance advantages offered by GaAs integrated circuits in the areas of radiation hardness, low power dissipation and high speed for the development of a 4K bit RAM. The DARPA process development program has complemented and provided a sound basis for the initial progress made in this RAM program. Using the existing GaAs technology as a base, the authors have initially focused their efforts on process areas unique to RAMS, on evaluation of the power concentration RAM (Random Access Memory) cell and on the design and fabrication of a 256 bit static memory chip. The development of operational 256 bit memory arrays has been used on three mask sets; namely AP1, RM2, and RM3. Mask set AP1 contained preliminary RAM cell designs for verification of design concepts and layout rules while RM2, using data obtained from AP1, focused on the design, fabrication and evaluation of 256 bit RAMs. The RM3 mask set was used to initiate the processing of 3 in. GaAs wafers, and at the same time to fabricate a fully functional 256 bit static RAM. Author (GRA)

N84-17891# Mitre Corp., Bedford, Mass.
HQ AFSC SELECTION OF A MICROPROCESSOR DEVELOPMENT SYSTEM
C. H. Price, Jr. Oct. 1983 62 p
(Contract F19628-82-C-0001)
(AD-A134930; MTR-8866; ESD-TR-83-205) Avail: NTIS HC A04/MF A01 CSCL 05/1

A microprocessor development system is essential to the system design laboratory where it is used to develop, test, and debug microprocessor-based circuitry and software. This report describes the functions and components of a typical development system, provides vendor selection criteria, and compares the characteristics of three proven or representative systems to determine the one most suitable for acquisition by HQ AFSC. Author (GRA)

N84-17892# National Bureau of Standards, Washington, D.C.
COMPUTER SCIENCE AND TECHNOLOGY: PROCEEDINGS OF THE 19TH MEETING OF THE COMPUTER PERFORMANCE EVALUATION USERS GROUP (CPEUG) Final Report
Deborah Mobray, ed. Oct. 1983 237 p refs Proc. held in San Francisco, 25-28 Oct. 1983
(PB84-114529; NBS/SP-500-104; LC-82-600594) Avail: NTIS HC A11/MF A01 CSCL 09B

The Computer Performance Evaluation Users Group (CPEUG 83) conference recognized the rapid introduction of sophisticated end user technology into the information processing environment and addressed the challenges posed to the CPE community. Topics ranging from microcomputers to supercomputers were covered. The increasingly complex area of data communications was presented as well as topics in office automation, software improvement and engineering, capacity planning and quality assurance. The program was divided into three parallel sessions and included technical papers, case studies, tutorials, and panels. GRA

N84-18090*# Massachusetts Inst. of Tech., Cambridge. Lab. for Computational Fluid Dynamics.
CALCULATING C-GRIDS WITH FINE AND EMBEDDED MESH REGIONS Final Report
Bernard Loyd *In its* A Coop. Program to Stimulate Student Involvement through the MIT Undergraduate Research Opportunity Program Jan. 1984 14 p refs (For primary document see N84-18086 08-80)
(CFDL-TR-83-7) Avail: NTIS HC A05/MF A01 CSCL 09B

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N84-17893 Rhode Island Univ., Kingston.
DESIGN AND PROTOTYPE IMPLEMENTATION OF SCAN: A PROGRAMMING LANGUAGE FOR SCENE ANALYSIS Ph.D. Thesis
Margaret Sabe Kulos 1983 191 p
Avail: Univ. Microfilms Order No. DA8326489

The design and development of a language for scene analysis is presented. The methodology for the development included an extensive literature search in the areas of computer vision, image processing, computer programming language and software psychology to define the requirements for a programming language to meet the needs of computer vision programs. The results language, called SCAN, is defined along with an approach for implementation. The language is dedicated to users who have a sophisticated level of knowledge in the field of computer vision and minimal expertise in the software aspects of computer science. It is directed toward a description of the image transformations and features rather than pixel manipulation i.e., close to the level in which the description of an algorithm might be written. In order to program in the language, users must be familar with its commands and syntax, but informal studies have shown that persons who were relatively unfamilar with the language but with an understanding of computer vision concepts were able to read and understand code written in SCAN. Dissert. Abstr.

N84-17894 State Univ. of New York, Buffalo.
REASONING IN MULTIPLE BELIEF SPACES Ph.D. Thesis
Joao Pavao Martins 1983 370 p
Avail: Univ. Microfilms Order No. DA8325085

The problem of how to derive new information from old information in domains involving common sense knowledge is discussed. The following questions are investigated: What kind of logic should underlie a computer program used for applications in common sense reasoning? What kind of provisos should be supplied by that logic in order to cope with the possible occurrence of contradictions? How should a computer program based on this logic distinguish between propositions believed by different agents? A local system, the SWM system, that relies on the notion of dependency and provides for dealing with contradictions is presented. The SWM system associates each proposition with

the set of hypotheses that were really used in its derivation and with all the sets of hypotheses with which it is inconsistent. The roles of inference of SWM are stated so that they prevent the combination of propositions known to be inconsistent.
Dissert. Abstr.

N84-17895 Iowa Univ., Iowa City.
A DEMAND-DRIVEN, COROUTINE-BASED IMPLEMENTATION OF A NONPROCEDURAL LANGUAGE Ph.D. Thesis
Carol Ann Panzer Denbaum 1983 245 p
Avail: Univ. Microfilms Order No. DA8325141

A nonprocedural language called ANPL, based upon the Lucid family of languages, is described, and semantic models of the language's data and sequence control aspects are presented. These models provide a general conceptual framework for an operational understanding of Lucid-like nonprocedural languages; their utility is demonstrated by their use as the basis of a demand-driven, coroutinebased implementation of ANPL. The ANPL implementation is a compiler-based system that translates programs into ACL source code. The ACL is a Pascal-based programming language with coroutine facilities; such a language is particularly suitable for the implementation of this kind of non-procedural language. This implementation has a number of advantages over previous attempts to implement Lucid-like languages, including the ability to accept semantically correct programs that are rejected by other compiler-based systems, and to correctly execute programs which cause incorrect, non-terminating computations when run on other compiler-based implementations. Dissert. Abstr.

N84-17896 University of Southwestern Louisiana, Lafayette.
AUTOMATIC SYNTHESIS OF ABSTRACT DATA TYPE IMPLEMENTATIONS FROM ABSTRACT SPECIFICATIONS Ph.D. Thesis
Boumediene Belkhouche 1983 213 p
Avail: Univ. Microfilms Order No. DA8325606

The objectives were to construct an environment with the capabilities of specification and automatic implementation of abstract data types. A specification language to express abstract data types was designed, and an automatic synthesis system that generates implementations from abstract specifications was designed and implemented. The transformation of abstract data type specifications into executable code raises issues of efficiency of the synthesis system and the code generated by such a process. The complexity analysis of the synthesis system algorithms shows that the critical algorithms of the system are generally linear. The efficiency of the code generated by the synthesis system was addressed through a structure and algorithm selection. The selection process relies on cost measures to suggest an implementation that minimizes the total cost. Evaluation of the specification language, the synthesis system, and the automatically-generated implementations was undertaken to assess the benefits of this effort, and its role as a software tool for specification, prototyping, and validation. Dissert. Abstr.

N84-17897 Science Research Council, Chilton (England).
PATTERN RECOGNITION AND IMAGE PROCESSING REVIEW
J. V. Kittler May 1982 79 p refs
Avail: Issuing Activity

Research on pattern recognition and image processing in Britain was reviewed. Scientific, industrial and medical applications are outlined. Hardware development, training, and funding are discussed. Author (ESA)

N84-17898# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
INTAC: DIGITAL AND ANALOG CIRCUIT TEST LANGUAGE [INTAC - LINGUAGEM DE TESTE DE CIRCUITOS DIGITAIS E ANALOGICOS]
Marcos Antonio Cardoso Cruz Jun. 1983 19 p refs In PORTUGUESE; ENGLISH summary Presented at the 10th Integrated Software and Hardware Seminar, Campinas, Brazil, 25-30 Jul. 1983
(INPE-2764-PRE/338) Avail: NTIS HC A02/MF A01

A PASCAL like test programming language for digital and analog circuits called INTAC is described. The new statements and declarations oriented for testing purposes, such as digital and analog signal handling, are the main topics of discussion. Author

N84-17899*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MODELLING ALGORITHM EXECUTION TIME ON PROCESSOR ARRAYS Final Report
Loyce M. Adams and Thomas W. Crockett (Kentron Technical Center) Jan. 1984 26 p refs
(Contracts NAS1-17070; NAS1-17130; NAS1-16000)
(NASA-CR-172289; ICASE-84-1; NAS 1.26:172289) Avail: NTIS HC A03/MF A01 CSCL 09B

A model for the execution time of parallel algorithms on processor arrays is described. The model is validated for the conjugate gradient algorithm on the eight processor Finite Element Machine at NASA Langley Research Center. Model predictions are also included for this algorithm on a larger array as the number of processors and system parameters are varied. Author

N84-17900*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PASCAL/48 REFERENCE MANUAL
John C. Knight and Roy W. Hamm (Computer Sciences Corp.) Jan. 1984 92 p Revised
(NASA-TM-85752; NAS 1.15:85752) Avail: NTIS HC A05/MF A01 CSCL 09B

PASCAL/48 is a programming language for the Intel MCS-48 series of microcomputers. In particular, it can be used with the Intel 8748. It is designed to allow the programmer to control most of the instructions being generated and the allocation of storage. The language can be used instead of ASSEMBLY language in most applications while allowing the user the necessary degree of control over hardware resources. Although it is called PASCAL/48, the language differs in many ways from PASCAL. The program structure and statements of the two languages are similar, but the expression mechanism and data types are different. The PASCAL/48 cross-compiler is written in PASCAL and runs on the CDC CYBER NOS system. It generates object code in Intel hexadecimal format that can be used to program the MCS-48 series of microcomputers. This reference manual defines the language, describes the predeclared procedures, lists error messages, illustrates use, and includes language syntax diagrams. Author

N84-17901# California Univ., San Diego. Lab. of Comparative Human Cognition.
PROCEEDINGS OF THE CONFERENCE ON JOINT PROBLEM SOLVING AND MICROCOMPUTERS
Michael Cole, Naomi Miyake, and Denis Newman 1 Aug. 1983 49 p Proc. held at San Diego, Calif., 31 Mar. - 2 Apr. 1983
(Contract N00014-83-G-0048)
(AD-A135001; LCHC-08-01) Avail: NTIS HC A03/MF A01 CSCL 05/8

A group of American and Japanese psychologists, anthropologists, linguists and computer scientists gathered at UCSD to discuss the role of joint problem solving in the learning process. A central issue for the group was expert-novice interaction both when the expert is a human and when it is embodied in a microcomputer tutoring system. Much of the discussion focused on microcomputers as instruments for organizing instruction. The group addressed questions such as: are new principles of learning likely to arise out of research using microprocessors? What kinds of learning models are likely to be most effective in exploiting the power of this technology? How can principles of human interaction be applied to the design of learning environments? GRA

N84-17902# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
NOTIONS OF DEPENDENCY SATISFACTION
Marc H. Graham, Alberto O. Mendelzon (Toronto Univ.), and Moshe

Y. Vardi (Stanford Univ.) Aug. 1983 38 p
(Grant AF-AFOSR-0212-80; AF Proj. 2304)
(AD-A135303; SU-STAN-CS-83-979; AFOSR-83-0961TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

Two notions of dependency satisfaction, consistency and completeness, are introduced. Consistency is the natural generalization of weak-instance satisfaction and seems appropriate when only equality-generating dependencies are given, but disagrees with the standard notion in the presence of tuple-generating dependencies. Completeness is based on the intuitive semantics of tuple-generating dependencies but differs from the standard notion for equality-generating dependencies. It is argued that neither approach is the correct one, but rather that they correspond to different policies on constraint enforcement, and each one is appropriate in different circumstances. Consistency and completeness of a state are characterized in terms of the tableau associated with the state and in terms of logical properties of a set of first-order sentences associated with the state. A close relation between the problems of testing for consistency and completeness and of testing implication of dependencies is established, leading to lower and upper bounds for the complexity of consistency and completeness. The possibility of formalizing dependency satisfaction without using a universal relation scheme is examined.
Author (GRA)

N84-17903# Naval Postgraduate School, Monterey, Calif.
A COMPUTER PROGRAM FOR SOLVING THE PARABOLIC EQUATION USING AN IMPLICIT FINITE-DIFFERENCE SOLUTION METHOD AND INCORPORATING EXACT INTERFACE CONDITIONS M.S. Thesis
L. E. Jaeger Sep. 1983 113 p
(AD-A135325) Avail: NTIS HC A06/MF A01 CSCL 09/2

An Implicit Finite-Difference (IFD) computer program that incorporates exact interface conditions has been developed for solving the parabolic equation. The model preserves continuity of pressure and continuity of the normal component of particle velocity at the interface between media having different sound speeds and densities. Interface conditions are preserved for horizontal and sloping interfaces along a user-specified bottom profile. Test cases are included to demonstrate the use of the model.
Author (GRA)

N84-17904# Texas Univ., Austin. Dept. of Computer Sciences.
A DISTRIBUTED PROCEDURE TO DETECT AND/OR DEADLOCK Interim Report
T. Herman and K. M. Chandy Jan. 1983 38 p
(Grant AF-AFOSR-0205-81; AF Proj. 2304)
(AD-A135459; AFOSR-83-0989TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

The authors present a procedure to detect deadlock in a distributed system. The procedure is dynamic and distributed. Deadlock will be correctly detected for general resource requests of the form: 'Lock file A and file B at NY or lock file A and file B at LA'. The contribution of this paper is that it presents a distributed solution to the deadlock detection problem when requests have AND/OR form.
GRA

N84-17905# SRI International Corp., Menlo Park, Calif. Artificial Intelligence Center.
KNOWLEDGE REPRESENTATION AND NATURAL-LANGUAGE SEMANTICS Annual Technical Report, 1 Jun. 1982 - 30 May 1983
R. C. Moore 26 Jul. 1983 9 p
(Contract F49620-82-K-0031; AF Proj. 2304)
(AD-A135476; AFOSR-83-0969TR; ATR-1) Avail: NTIS HC A02/MF A01 CSCL 06/4

This report summarizes the first year of research on a project to produce formalisms, suitable for manipulation by computer, for the representation of specific concepts that are important for natural-language semantics, and to give an independent account of the meaning of such representations using the tools of formal logic. The major technical achievement of this effort has been the development of a logic which characterizes systems which represent and reason with information about their own beliefs. Other problems worked on include the development of semantic representations for comparative constructions in English and the analysis of deductive methods for common sense reasoning.
Author (GRA)

N84-17906# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
TIGS (TABLE PLOT INTERACTIVE GRAPHICS SYSTEM)--AN INTERACTIVE GRAPHICAL SYSTEM FOR THE CREATION AND CORRECTION OF TABULAR DATA SETS Final Report
M. J. Caddy 1 May 1983 66 p
(W05-98; WO04-77)
(AD-A135522; NADC-83030-60) Avail: NTIS HC A04/MF A01 CSCL 09/2

The NAVAIRDEVCEN (Naval Air Development Center) is a large user of vehicle and propulsion design and performance computer codes and is constantly seeking to improve their efficiency and flexibility. A significant number of these codes are dependent on the use of input tabular data sets. Quite frequently these data sets are initially received in a format incompatible with direct use in these codes, resulting in a time consuming, error prone transformation task. To circumvent this problem, development of a rapid data transformation code was undertaken. The impetus for this effort was the need to prepare for a planned substantial increase in analyses of various aircraft and propulsion system. This present report describes a code based on the use of an interactive graphics system that permits direct creation of digital tabular data sets from material in graph form, utilizing a Tekronics 4015 graphics terminal, digitizer tablet and hardcopy unit. In addition the user may edit and correct these data directly from the digitizer tablet or from the graphics display screen using cursor cross hairs and tablet commands. This code, entitled TIGS (Table Plot Interactive Graphics System) was developed using the NAVAIRDEVCEN CDC 6600/Cyber 175 computer facilities. A user's guide for this code is shown in Appendix A. A FORTRAN listing to the TIGS code is shown in Appendix B.
GRA

N84-17907# Interactive Systems Corp., Littleton, Colo.
HEXAGONAL DATA BASE STUDY Final Report, Aug. 1982 - Aug. 1983
T. R. Bundy Sep. 1983 88 p
(Contract DAAK70-82-C-0133)
(AD-A135532) Avail: NTIS HC A05/MF A01 CSCL 09/2

This is a final report for a study in the application of hexagonal data structures to handling geographic information. This report presents the results of an experimental software implementation utilizing hexagonal data structures as applied to test data base.
Author (GRA)

N84-17908# Rochester Univ., N. Y. Dept. of Computer Science.
HIERARCHICAL CACHE ACCUMULATORS FOR SEQUENTIAL MODE ESTIMATION
Christopher M. Brown Jul. 1983 23 p Presented at a Workshop on Statistical Image Processing and Graphics, Luray, Va., May 1983 Submitted for publication
(Contracts N00014-78-C-0164; N00014-82-K-0193; Grant NSF MCS-83-02038)
(AD-A134698; TR-125) Avail: NTIS HC A02/MF A01 CSCL 09/2

A quad-tree-like data structure can be implemented with a content-addressable cache. The resulting structure captures spatial relations at several resolutions. Spatial relations such as containment and contiguity may be useful in flushing Cache-Hough Transform accumulators. Algorithms for accumulator cache management may be written that are related to some proposed in the literature for statistical mode estimation.
Author (GRA)

N84-17909# General Electric Co., Sunnyvale, Calif.
RADC (ROME AIR DEVELOPMENT CENTER) DDP (DISTRIBUTED DATA PROCESSING) TOPOLOGY EVALUATION Final Technical Report, 25 Aug. 1980 - 25 Sep. 1982

D. DuBois Aug. 1983 183 p
(Contract F30602-80-C-0267; AF Proj. 5581)
(AD-A134701; RADC-TR-83-79) Avail: NTIS HC A09/MF A01 CSCL 09/2

This report presents a technical overview of the Distributed System Simulator, a modeling tool which can be used to facilitate the performance analysis of computer systems and networks through simulation. It is implemented in Simscript II.5 (an event oriented simulation language) and ECSS II (a special-purpose simulation language designed to simulate computer systems). The DSS models may use any of the statements from these two languages; its major function is to extend the capability of these languages to model computer networks. Author (GRA)

N84-17910# California Univ., Berkeley.
PROGRAM FOR THE ANALYSIS OF FAULT TREES Research Report
T. A. Feo Oct. 1983 41 p
(Contract DAAG29-81-K-0160)
(AD-A134746; ORC-83-14; ARO-18195.6-MA) Avail: NTIS HC A03/MF A01 CSCL 09/2

Document describes PAFT F77, a program for the analysis of fault trees coded in FORTRAN 77. Given the structure of a fault tree and the probability or failure rates of its basic events, PAFT F77 calculates the probabilities of the top and all intermediate events, as well as the marginal importances of all basic events. When the input is in terms of failure rates instead of probabilities, the marginal occurrence rates of all basic events and the occurrence rate of the top event are also calculated. This additional information though, is invalid for fault trees comprising NOT gates or those gate types that must be modeled with NOT gates such as exculsive OR gates. The program is designed to handle simple fault trees and those with replicated basic events. The introduction to this text describes the program's ability and limitations together with a brief theoretical review of fault trees analysis. The second section is a users guide to PAFT F77 on the UNIX operating system at the University of California, Berkeley. The final section gives an in depth description of the program's FORTRAN 77 code. Author (GRA)

N84-17911# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
FEASIBILITY ASSESSMENT OF JOVIAL TO ADA TRANSLATION
D. H. Ehrenfried Aug. 1983 48 p
(AF Proj. 2003)
(AD-A134857; AFWAL-TR-83-1058) Avail: NTIS HC A03/MF A01 CSCL 09/2

The Ada program is part of a DoD policy change towards incrementally reducing the number of languages in use by the DoD from many to only a few and then eventually to just one; Ada. Currently, is the Air Force standard language for use in the embedded application domain. One approach towards an earlier transition of all software written in Ada would be the development of an automatic J73 to Ada translation system. With the translation of all J73 software into Ada, J73 software development systems could be phased out of use, the cost of maintaining the J73 system could be recovered, and programmers would be freed earlier for their eventual transition to Ada. This paper will examine the feasibility and cost effectiveness of developing a J73 to Ada translation system. GRA

N84-17912# Naval Postgraduate School, Monterey, Calif.
A MULTIPLE LEG TMA (TARGET MOTION ANALYSIS) PROCEDURE WITH PROGRAMS FOR THE HEWLETT-PACKARD HP-41CV, THE HEWLETT-PACKARD HP-75C, THE SHARP pC-1500 (TRS-80 pC AND THE RADIO SHACK TRS-80 MODEL 100 PORTABLE COMPUTERS
R. H. Shudde Sep. 1983 35 p
(AD-A134870; NPS55-83-025) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report contains user instructions and program listings for multiple leg Kalman Filter target motion analysis (TMA) procedure for use on the Hewlett-Packard HP-41CV, the Hewlett-Packard HP-75C, the Sharp pC-1500 (Radio Shack TRS-80 PC-2) and the Radio Shack Model 100 portable computers. Author (GRA)

N84-17913# Sonicraft, Inc., Chicago, Ill.
ADVANCED EDIT SYSTEM Final Technical Report, Sep. 1979 - May 1982
Kenneth Karow Fort Belvoir, Vir. Army Engineer Topographic Labs. Jan. 1983 53 p
(Contract DAAK70-79-C-0180)
(AD-A134952; ETL-0295) Avail: NTIS HC A04/MF A01 CSCL 09/1

An advanced edit system with high resolution interactive graphic workstations and support software for editing digital cartographic and mapping data was developed to be used by Defense Mapping Agency Aerospace Center. The hardware consists of PDP-11/70 computer with two Intergraph Corp. dual screen workstations; one has vector storage tubes; the other workstation has a raster color display with 1024 by 1024 pixels. Conversion software programs were developed to convert AGDS Scan Data, CRT Printhead data, Gerber plot data, DLMS Culture and Terrain data, and RAPS data (various cartographic data base and plotter data instructions) into the Intergraph design file data format for display and editing. Additional programs convert the design file data back to the various data bases or plotter instructions. Numerous interactive graphic manipulation commands are provided as a starting point for developing special commands to move, delete, and, or copy features in a design file. Author (GRA)

N84-17914# California Univ., Livermore. Lawrence Livermore Lab.
SOFTWARE MAINTENANCE ON FORTRAN LIBRARIES AT A LARGE COMPUTER INSTALLATION
Barbara Atkinson and George Sutherland 7 Oct. 1983 7 p Presented at the Software Maintenance Workshop, Monterey, Calif., 6-8 Dec. 1983
(Contract W-7405-eng-48)
(DE84-002008; UCRL-89913; CONF-831247-1) Avail: NTIS HC A02/MF A01

Some of the tools and procedures used to maintain a large library of FORTRAN service subroutines are described. A history of library development is given, and some aspects of testing are discussed. DOE

N84-17915# Forschungsinstitut fuer Informationsverarbeitung, Karlsruhe (West Germany).
STANDARD METHODS FOR IMAGE PROCESSING. PART 4: OPERATING INSTRUCTIONS FOR THE PROGRAM SYSTEM Final Report, Dec. 1982 [STANDARDMETHODEN DER BILDVERARBEITUNG. TEIL 4: ANLEITUNG AUR BEDIENUNG DES PROGRAMMSYSTEMS]
Udo Schlifkowitz Bonn Bundesministerium der Verteidigung Feb. 1983 129 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium der Verteidigung
(BMVG-FBWT-83-1; FIM-100) Avail: NTIS HC A07/MF A01; DOKZENTBw, Bonn DM 60

The manual of the program system for standard image processing used with a DEC computer VAX 11/780 is presented. Access to the system and entering of commands is covered. Linear and simple nonlinear image transformations are described. Author (ESA)

N84-17916# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
IMPROVEMENT OF THE MEMORY ALLOCATION ALGORITHM FOR EVALUATING QUERY LANGUAGE EXPRESSIONS IN THE RELATIONAL DATABASE HANDLER CANTOR
Christian Ehrenborg Sep. 1983 61 p refs In SWEDISH; ENGLISH summary
(FOA-C-20508-D8; ISSN-0347-3694) Avail: NTIS HC A04/MF A01; Research Institute of National Defence, Stockholm KR 60

Specifications, implementation, and performance of a data

base memory allocation algorithm are described. Queries are mapped onto a hierarchical dataflow net, and evaluated by interpreting the net, in principle like a hierarchical data flow machine. The algorithm utilizes memory more efficiently, increasing the work areas of operators in the net, thus enabling the operators to work in longer passes. Execution time decreases. The algorithm also allows more complex expressions to be evaluated.
Author (ESA)

N84-17917# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
DEVELOPMENT OF A COMPUTER PROGRAM FOR ROAD DETECTION IN SATELLITE IMAGES
Leif Ekeroot Sep. 1983 74 p refs In SWEDISH; ENGLISH summary
(FOA-C-30316-E1; ISSN-0347-3708) Avail: NTIS HC A04/MF A01; Research Inst. of National Defence, Stockholm KR 50

A program for detection of roads in low resolution images, where the roads are only a few pixels wide is described. The role of the road operator, detecting light intensity variations around a point, showing that this point could make part of a road, is outlined. The Unwhite method is applied for eliminating false image information.
Author (ESA)

N84-17918# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
DESK-TOP COMPUTER CONTROLLED INSTRUMENT LATHE FOR MACHINING WITH HIGH FORM ACCURACY
Hans Hellsten and Ain Sume Oct. 1983 83 p In SWEDISH; ENGLISH summary
(FOA-C-30339-E1,E3; ISSN-0347-3708) Avail: NTIS HC A05/MF A01; Research Inst. of Natinal Defence, Stockholm KR 50

An instrument lathe, with the transversal and longitudinal movements of the lathe tool controlled by a desk-top computer via two stepping motor drives, for generation of arbitrary surfaces with rotationel symmetry with high form accuracy, was developed. Generation of a planoconvex two-frequency mm-wave lens, optimized for two foci is treated. The corresponding software includes a general rough-turning procedure, where the work piece is given approximately the desired shape, and where only macroscopic information about the detailed turning movements is necessary. A special finish-turning procedure exists, where the exact lens form is generated, and where computer calculates control data for the finish-turning, essentially in real-time.
Author (ESA)

N84-17919# Office of Software Development, Falls Church, Va.
SPERRY UNIVAC, UNIVAC 1100/80, UBASIC/BBASIC LEVEL 9R1 Validation Summary Report
May 1983 18 p
(PB84-113901; OSD/FSTC-83/196) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Sperry Univac, UBASIC/BBASIC Level 9R1 running under the OS1100 Level 38R5 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 BASIC Standard (X3.60-1978/FIPS PUB 68). The compiler was validated against the Minimal BASIC level of FIPS PUB 68. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies within X3.60-1978 and a detailed listing of discrepancies together with the tests which failed. GRA

N84-17920# Office of Software Development, Falls Church, Va.
SPERRY UNIVAC, UNIVAC 1100/80, ASCII FORTRAN LEVEL 10R1A Validation Summary Report
May 1983 17 p
(PB84-113893; OSD/FSTC-83/195) Avail: NTIS HC A02/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Sperry Univac, ASCII 1100/80 running under the OS1100 Level 38RS provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1978 FORTRAN Standard (X3.9-1978/FIPS PUB 69). The compiler was validated against the Full Leve FORTRAN level of FIPS PUB 69. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-17921# Helsinki Univ. (Finland). Dept. of Computer Science.
EMPIRICAL STUDIES OF PROGRAM BEHAVIOUR IN VIRTUAL MEMORY
Timo O. Alanko Nov. 1983 70 p refs
(PB84-112267; A-1983-3; ISSN-0356-6951) Avail: NTIS HC A04/MF A01 CSCL 09B

A review of the theoretical and empirical work concerning the behavior of an individual program in virtual memory is given. Further, the methodological aspects and the results of four empirical studies are summarized. The first study contained the presentation of the methodology and empirical results concerning various basic program performance characteristics. The second examined program restructuring in segmented virtual memory; a conceptual model of program behavior was presented. The third compared the performance of segmentation and paging and examined the way the page size affects some performance indices. In the fourth, data describing the behavior of some sorting algorithms was investigated. All of these studies were performed using data gathered from real program executions. GRA

N84-17922# National Bureau of Standards, Washington, D.C. National Engineering Lab.
INITIAL GRAPHICS EXCHANGE SPECIFICATION TEST LIBRARY, VERSION 1.3 Report, 30 Sep. 1981 - 28 Feb. 1983
Bradford Smith and Michael Liewald (Boeing Commercial Airplane Co.) Sep. 1983 225 p Sponsored in part by AF
(PB84-102144; NBSIR-83-2704) Avail: NTIS HC A10/MF A01 CSCL 09B

A library of benchmark tests to be used to verify the interface capability possible with the Initial Graphics Exchange Specification (IGES) is given. The IGES provides a common data format to facilitate the exchange of data between different computer aided design/computer aided manufacturing (CAD/CAM) systems. The test cases outlined provide data for software modules which translates IGES format to and from the format of a particular CAD/CAM system. The geometric and drafting entities contained in these parts comprise only a limited portion of all IGES entities and are intended to demonstrate some capabilities of an IGES translator on an individual entity basis. This set of tests does not constitute a test of compliance with any existing or proposed standardization of IGES. Subsequent tests with more complex parts should be made to insure the suitability of the processors for a user's production environment. GRA

N84-17923# Federal Compiler Testing Center, Falls Church, Va.
FOUR PHASE SYSTEMS, INCORPORATED IV/90 MOD 2 COBOL '74 RELEASE BE07 Validation Summary Report
2 Aug. 1983 54 p
(PB84-102706; OSD/FSTC-83/240) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the Four Phase Systems, Inc., COBOL '74 Release BE07 running under the MFE/IV Release BN07 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the Low Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N84-17924# Federal Compiler Testing Center, Falls Church, Va.
FOUR PHASE SYSTEMS, INCORPORATED IV/90 MOD 2 COBOL '74 RELEASE BE07.COBOL TECHNICAL REPORT
2 Aug. 1984 16 p
(PB84-102714; OSD/FSTC-83/241) Avail: NTIS HC A02/MF A01 CSCL 09B

This FSTC Technical Report for the Four Phase Systems, Inc., COBOL '74 Release BE07 running under the MFE/IV Release BN07 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O, Level 1 of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the discrepancies found, if any. A companion report Validation Summary Report OSD/FSTC-83/240 provides information regarding the validation of the compiler as the Low-Intermediate level of Federal Standard COBOL (FIPS PUB 21-1). GRA

N84-17925# National Weather Service, Kansas City, Mo. Forecast Office.
THERMODYNAMICS LIBRARY FOR AFOS (AUTOMATION OF FIELD OPERATIONS AND SERVICES) PROGRAMMERS (THERMO LB)
Warren E. Sunkel Nov. 1983 30 p
(PB84-122621; NOAA-NWS-CRCP-10; NOAA-83111404) Avail: NTIS HC A03/MF A01 CSCL 09B

THERO IB is a collection of FORTRAN function subprograms which compute frequently used variables in thermodynamic analysis. The subprograms are designed for maximum computational efficiency while maintaining a high degree of scientific accuracy. All of the subprograms contained in this library are compatible with the Data General S/230 minicomputers of the AFOS system when loaded with the FORTRAN library (FORT.LB). Each subprogram requires fewer than 300 octal locations of NEREL memory, but additional memory is required by the FORT.LB supporting routines. GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N84-17926# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MODEL AND ANALYSIS OF A COMMUNICATION INTERFACE WITH DISTRIBUTED PROCESSING FOR APPLICATION IN A COMMUNICATION NETWORK BY PACKET SWITCHING M.S. Thesis [MODELO E ANALISE DE UMA INTERFACE DE COMUNICACAO COM PROCESSAMENTO DISTRIBUIDO PARA APLICACAO EM REDE DE COMUNICACAO POR COMUTACAO DE PACOTES]
Mauro Hissao Hashioka Jun. 1983 118 p refs In PORTUGUESE; ENGLISH summary
(INPE-2773-TDL/136) Avail: NTIS HC A06/MF A01

A model of a communication interface (based on the utilization of multiple microprocessor with temporary data storage capacity) applied to data communication networks is presented. An analytical model based on queue theory to obtain the estimation measures of average delay of a data packet in proposed interface is emphasized. Author

N84-17927# State Univ. of New York, Stony Brook. Dept. of Computer Science.
[COMPUTER NETWORKS WITHOUT A SHARED MEMORY AFOSR-81-0197] Interim Report
A. J. Bernstein Jul. 1983 7 p
(Grant AF-AFOSR-0197-81; AF Proj. 2304)
(AD-A135074; AFOSR-83-0930TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

The research performed under this grant centers on the concept of a network computer. By this the authors mean a network of computers (no shared memory) which can be programmed as if it were a single virtual machine using a high level distributed language. Work during this past year can be divided into three areas: Distributed Algorithms; Distributed Languages; and An Implementation of Multicasting on a Network Computer. This report summarizes progress achieved during the past year. Author (GRA)

N84-17928# California Univ., Los Angeles. Dept. of Electrical Engineering.
PERFORMANCE EVALUATION AND CONTROL OF DISTRIBUTED COMPUTER COMMUNICATION NETWORKS Annual Report, 1 Jul. 1982 - 30 Jun. 1983
I. Rubin and M. Gerla 30 Jun. 1983 25 p
(Grant AF-AFOSR-0304-82; AF Proj. 2304)
(AD-A135121; UCLA-ENG-83-47; AFOSR-83-0952TR) Avail: NTIS HC A02/MF A01 CSCL 05/1

During the 1982/83 first year performance-period under this Grant, research investigations have been carried out leading to significant results, of both theoretical and practical importance. A large multitude of computer communication network architectures, models and control schemes have been developed, analyzed and evaluated. In particular, results have been obtained in the following areas: priority-based Time Division Multiple Access schemes; dynamic random-access procedures, with applications to local area networks and to local distribution and packet-radio networks; hybrid multiple-access schemes; polling, adaptive polling and probing access-control techniques; buffer capacity constrained multi-access systems; network topological analysis; local area network topological analysis; local area network protocols; integrated packet and circuit networks;integrated routing and flow control. GRA

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N84-17929# University of Southern California, Marina del Rey. Inst. for Information Sciences.
INQUIRY SEMANTICS: A FUNCTIONAL SEMANTICS OF NATURAL LANGUAGE GRAMMAR
William C. Mann Oct. 1983 20 p Presented at the 1st Ann. Conf. of th Assoc. for Computational Linguistics, Pisa (Italy), Sep. 1983
(Contract F49620-79-C-0181)
(AD-A135153; ISI/RS-83-8) Avail: NTIS HC A02/MF A01 CSCL 05/7

Programming a computer to operate to a significant degree as an author is a challenging research task. The creation of fluent multiparagraph text is a complex process because knowledge must be expressed in linguistic forms at several levels of organization, including paragraphs, sentences and words, each of which involves its own kinds of complexity. Accommodating this natural complexity is a difficult problem. To solve it we must separate the various relevant kinds of knowledge into nearly independent collections, factoring the problem. Inquiry semantics is a new factoring of the text generation problem. It is novel in that it provides a distinct semantics for the grammar, independent of world knowledge, discourse knowledge, text plans and the lexicon, but appropriately linked to each. It has been implemented as part of the Nigel text generation grammar of English. This paper characterizes inquiry semantics, shows how it factors text generation, and describes its exemplification in Nigel. The resulting description of inquiries for English has three dimensions: the varieties of operations on information, the varieties of information operated upon, and the subject matter of the operations. The definition framework for inquiries involves both traditional and nontraditional linguistic abstractions, spanning the knowledge to be represented and the plans required for presenting it. Author (GRA)

N84-17930# Northeastern Univ., Boston, Mass.
ASYNCHRONOUS DISCRETE CONTROL OF CONTINUOUS PROCESSES Annual Report, 1 Jul. 1982 - 30 Jun. 1983
M. E. Kaliski and T. L. Johnson 30 Jul. 1983 99 p
(Contract F49620-82-C-0080; AF Proj. 2304)
(AD-A135257; AFOSR-83-0877TR) Avail: NTIS HC A05/MF A01 CSCL 09/3

This research concerns the analysis and synthesis of asynchronous discrete-state or hybrid-state feedback compensators for continuous or hybrid-state processes. New realization theories for asynchronous discrete systems, based on automata and semigroup theory, have been derived. These theories suggest new architecture for asynchronous systems. Author (GRA)

N84-17931# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
SELECTION OF NOISY SENSORS AND ACTUATORS FOR REGULATION OF LINEAR SYSTEMS Ph.D. Thesis
M. L. DeLorenzo Aug. 1983 254 p
(AD-A135442; AFIT/GI/NR-83-59D) Avail: NTIS HC A12/MF A01 CSCL 12/1

This research has developed and tested an algorithm which aids the controls engineer in placing sensors and actuators in a linear system to best achieve a set of variance specifications on the outputs and inputs of the system. The term best achieve has been defined to be the sensor and actuator configuration which enables a controller to do either of the following: Meet the input specifications while minimizing a sum of output variances normalized by their specification (i.e. input-constrained solution), or meet the output specifications while minimizing a sum of input variances normalized by their specification (i.e., output-constrained solution). The approach taken to solve this sensor and actuator selection (SAS) problem was to use LQG (Linear Quadratic Gaussian) theory to specify a structure for the controller, and then develop an algorithm (SASLQG) that places sensors and actuators in this controller structure to achieve either the input-constrained or output-constrained solution. The main advantage of this approach is the mathematical ease which LQG theory addresses variance constraints, and the main disadvantage is that there may be other controller structures which do better. GRA

N84-17932# Tel-Aviv Univ. (Israel). Inst. of Business.
MUTUAL ADAPTIVENESS OF MAN AND MACHINE IN INFORMATION ACQUISITION TASKS Final Technical Report
M. Ben-Bassat Aug. 1983 29 p
(Contract DAJA37-81-C-0065; DA Proj. 2Q1-61102-B-74-D)
(AD-A135449; ARI-TR-575) Avail: NTIS HC A03/MF A01

Efforts were directed toward the followng tasks: survey and organize a list of analytic feature evaluation functions for use in information acquisition tasks; formulate military situation assessment tasks as hierarchical multiperspective pattern classification problems, and develop an approach for a decision support system for situation assessment; design, develop, and test the Information Acquisition software by which computer-based simulation of behavioral and analytical information acquisition strategies may be investigated; and design, develop and test the INFOACQ. EXP software which tracks information acquisition strategies employed by human decision maker in sequential classification tasks. GRA

N84-17933# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.
ROBOTIC TECHNOLOGY APPLIED TO ARMY MOBILITY SYSTEMS
R. J. Chavez, C. A. Amazeen, and H. L. Keller Jul. 1983 56 p
(DA Proj. 1L1-62733-AH-20)
(AD-A134728; AD-E301230; MERADCOM-2387) Avail: NTIS HC A04/MF A01 CSCL 09/2

Recognizing that the U.S. Army Corps of Engineers has a need for applying industrial robotic technology to high-risk and labor intensive tasks performed in the environment of a modern battlefield, USAMERADCOM started a small investigative project in a specific robotic application area--robotics applied to rapid excavation. The excavator used was a modified J. I. Case Model 35 Backhoe mounted on a highly mobile Mercedes Unimog truck. The conditions of the modern battlefield make rapid excavation extremely hazardous to the human operators due to the advent of highly accurate, technologically sophisticated weapons systems and the possibility of nuclear, biological, and/or chemical contamination of the battlefield environment. The goal, then, of the project was to eliminate or reduce through automation as much of the manual digging operation of the backhoe as would be consistent with current operating procedures. This report describes the system design and modifications associated with the implementation of a hierarchical 8-bit microprocessor control structure to the backhoe excavation cycle. The feedback control structure associated with driving a third order system consisting of electro-hydraulic values, microprocessors, optical encoders, and inertial loads is described along with an analysis of the predicted transient response. GRA

N84-17934# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
MYOPIC HEURISTICS FOR THE WEIGHTED TARDINESS PROBLEM ON IDENTICAL PARALLEL MACHINES Interim Report
R. M. V. Rachamadugu and T. E. Morton 15 Aug. 1983 28 p
(AD-A134934; CMU-RI-TR-83-17) Avail: NTIS HC A03/MF A01 CSCL 12/1

The authors study the problem of scheduling jobs on parallel identical machines to minimize weighted tardiness. There are no known heuristics for this problem. The heuristic rule developed is simple. It can be used in the dispatch mode which makes it very practical. Characterizations of optimal solutions are presented. Computational results show that the myopic heuristic performed well vis-a-vis other rules such as the Earliest Due Date Rule, Weighted Shortest Processing Time Rule and two versions of Montagne's Rule. Reported are computational results and also the performance of the heuristic in comparison to high computational benchmarks. Author (GRA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N84-17935 Iowa Univ., Iowa City.
TEMPORAL FINITE ELEMENTS BASED ON A MINIMUM PRINCIPLE FOR INITIAL VALUE PROBLEMS Ph.D. Thesis
Sachio Nakamura 1983 160 p
Avail: Univ. Microfilms Order No. DA8325168

A symmetric, convex functional is presented whose necessary conditions for minimization are the differential equations of motion and appropriate initial conditions. A temporal finite element method is developed by discretizing this functional, using shape functions in a manner analogous to the development of spatial finite elements. The equations of motion for a linear dynamic system are thus reduced to a set of linear algebraic equations. The resulting coefficient matrix is large but very sparse and well structured. A computational technique is developed that takes advantage of the special structure of this matrix to collapse its nonzero elements into a narrow band, to increase solution efficiency. The resulting dynamic analysis technique is stable for arbitrary time discretizations and works well for stiff systems. Convergence is uniform and even in a global sense. That is, the error at the final time point is no greater than the error anywhere else in the global time interval. Computational examples are presented to compare this technique with various integration techniques. Examples include multiple degree of freedom particle problems and a spatial finite element discretized beam. Dissert. Abstr.

N84-17936*# PEDA Corp., Palo Alto, Calif.
UNIVERSAL SINGLE LEVEL IMPLICIT ALGORITHM FOR GAS-DYNAMICS
C. K. Lombard and E. Venkatapthy Jan. 1984 47 p refs
(Contracts NAS2-11504; F49629-83-C-0084)
(NASA-CR-166531; NAS 1.26:166531) Avail: NTIS

HC A03/MF A01 CSCL 12A

A single level effectively explicit implicit algorithm for gas-dynamics is presented. The method meets all the requirements for unconditionally stable global iteration over flows with mixed supersonic and supersonic zones including blunt body flow and boundary layer flows with strong interaction and streamwise separation. For hyperbolic (supersonic flow) regions the method is automatically equivalent to contemporary space marching methods. For elliptic (subsonic flow) regions, rapid convergence is facilitated by alternating direction solution sweeps which bring both sets of eigenvectors and the influence of both boundaries of a coordinate line equally into play. Point by point updating of the data with local iteration on the solution procedure at each spatial step as the sweeps progress not only renders the method single level in storage but, also, improves nonlinear accuracy to accelerate convergence by an order of magnitude over related two level linearized implicit methods. The method derives robust stability from the combination of an eigenvector split upwind difference method (CSCM) with diagonally dominant ADI(DDADI) approximate factorization and computed characteristic boundary approximations. Author

N84-17937# Mathematisch Centrum, Amsterdam (Netherlands).
EISENSTEIN SERIES ON THE METAPLECTIC GROUP: AN ALGEBRAIC APPROACH
G. F. Helminck 1983 91 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-161; ISBN-90-6196-257-9) Avail: NTIS HC A05/MF A01

The metaplectic group, properties of Mp(k sub v) and Mp(A), dependence of tau, theta series, Einstein series, Hecke algebras, decomposition of S(chi (m)) in the ral case, Whittaker models in the real case, the imaginary case, generalities about algebraic representations, the D(k)-module structure of S(chi (m)) sub 1, computation of M(nu (2)chi/cm)) tau x M(chi (m)), Whittaker models, mesomorphic continuation of the Fourier coefficients, convergence of the sum of the Fourier coefficients, the residue of the Einstein series in s = 3/2, and the functional equation of the Einstein series are discussed. N.W.

N84-17938# Mathematisch Centrum, Amsterdam (Netherlands).
ABSTRACT AUTOMATH
A. Rezus 1983 207 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-160; ISBN-90-6196-256-0) Avail: NTIS HC A10/MF A01

A theoretical aspect of the main AUTOMATH systems, that is, the possibility of 'separating' the 'lambda-calculus-free' part from a 'full Aut-system is discussed. Well-formedness and correctness in language definition are addressed. PA-separation and global structure of correctness are also addressed. N.W.

N84-17939# Mathematisch Centrum, Amsterdam (Netherlands).
TESTS FOR PREFERENCE
J. J. Dik 1983 171 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-162; ISBN-90-6196-259-5) Avail: NTIS HC A08/MF A01

Theorems; consistency, asymptotic distinctions and power; asymptotic relative efficiencies; special cases and practices; expectation and variance; choice of a quadratic form; numerical results are provided. Author

N84-17940# Mathematisch Centrum, Amsterdam (Netherlands).
MARKOV DECISION PROCESSES WITH CONTINUOUS TIME PARAMETER
F. A. VanDerDuynSchouten 1983 210 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-164; ISBN-90-6196-261-7) Avail: NTIS HC A10/MF A01

Probability theory on metric spaces, Markov decision drift processes on J(o, infinity), equivalent policies, cost functionals on J (0, infinity), an M/M/1 queuing model, a maintenance replacement model, and an inventory model are discussed. N.W.

N84-17941*# Columbia Univ., New York. Dept. of Applied Physics and Nuclear Engineering.
INTRINSIC ADAPTIVE MESH TECHNIQUES Final Report, 1 Apr. - 31 Oct. 1983
Peter R. Eiseman and C. K. Chu 31 Oct. 1983 6 p refs
(Grant NAG1-355)
(NASA-CR-175375; NAS 1.26:175375) Avail: NTIS HC A02/MF A01 CSCL 12A

An alternating direction adaptive grid movement code was developed and a thesis angular meshes was directed. The alternating direction code was also established on the NASA Langley computer system and is available for use there. In essence, grid points are moved on an abstract surface above physical space by means of alternating coordinate directions. The abstract surface is formed with the salient solution properties if they can be extracted by a priori physical reasoning; or otherwise, in the absence of such reasoning, by the use of error estimates in some chosen norm. Upon formulation, all important driving properties for adaptive purposes are consolidated into one object - the abstract surface. At a basic level, a uniform distribution of surface points is equivalent to gradient resolution. This arises from a projection back down into physical space. At a higher level, a more accurate view of the abstract surface is obtained when changes in surface direction are also resolved. The appropriate measure for direction changes is normal curvature. It is defined as the rate of change of surface tangent planes as a surface coordinate curve is transversed in uniform increments of arc length. Author

N84-17942# San Diego State Univ., Calif. Dept. of Mathematical Sciences.
SIGNAL DETECTION FOR SAME-SHAPE FAMILIES OF NON-HOMOGENEOUS POISSON PROCESSES
R. Lui, C. B. Bell, L. Gavin, J. Moser, and E. Pugh Sep. 1983 66 p
(Contract N00014-80-C-0208)
(AD-A135032; Rept-4-83) Avail: NTIS HC A04/MF A01 CSCL 12/1

Non-Gaussian signal detection problems are treated in the context of same-shape families of non-homogeneous Poisson processes. The ratio of mean functions of two processes in such a family is a constant. Five different signal detection problems and five different sampling protocols are considered. Optimal procedures based on minimal sufficient statistics are developed. Author (GRA)

N84-17943# Technion - Israel Inst. of Tech., Haifa.
ON MODIFICATIONS OF THE ZAKHAROV EQUATION FOR SURFACE GRAVITY WAVES
Michael Stiassnie and Lev Shemer (MIT) Jul. 1983 42 p
(Contract DAJA37-82-C-0300; DA Proj. 1T1-61102-BH-57)
(AD-A135050) Avail: NTIS HC A03/MF A01 CSCL 12/1

Zakharov integral equation for surface gravity waves is modified to include higher order (Class II) interactions, for water of constant (finite or infinite depth). This new equation is used to study some aspects of Class I and Class II instabilities of a Stokes wave. Author (GRA)

N84-17944# Massachusetts Inst. of Tech., Cambridge. Statistics Center.
MAXIMUM LIKELIHOOD RECONSTRUCTION IN EMISSION TOMOGRAPHY WITH TIME-OF-FLIGHT INFORMATION: A LIMITED STUDY
L. Kaufman, S. Morgenthaler, and Y. Vardi Oct. 1983 20 p
(Contract N00014-75-C-0555)
(AD-A135061; TR-ONR-33) Avail: NTIS HC A02/MF A01 CSCL 12/1

The maximum likelihood reconstruction for positron emission tomography (PET) and its use in connection with time-of-flight (TOF) tomography are reviewed and the issue of trade-off between information and data (that is, time of flight information vs. additional

N84-17930# Northeastern Univ., Boston, Mass.
ASYNCHRONOUS DISCRETE CONTROL OF CONTINUOUS PROCESSES Annual Report, 1 Jul. 1982 - 30 Jun. 1983
M. E. Kalieki and T. L. Johnson 30 Jul. 1983 99 p
(Contract F49620-82-C-0080; AF Proj. 2304)
(AD-A135257; AFOSR-83-0877TR) Avail: NTIS HC A05/MF A01 CSCL 09/3

This research concerns the analysis and synthesis of asynchronous discrete-state or hybrid-state feedback compensators for continuous or hybrid-state processes. New realization theories for asynchronous discrete systems, based on automata and semigroup theory, have been derived. These theories suggest new architecture for asynchronous systems. Author (GRA)

N84-17931# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
SELECTION OF NOISY SENSORS AND ACTUATORS FOR REGULATION OF LINEAR SYSTEMS Ph.D. Thesis
M. L. DeLorenzo Aug. 1983 254 p
(AD-A135442; AFIT/CI/NR-83-59D) Avail: NTIS HC A12/MF A01 CSCL 12/1

This research has developed and tested an algorithm which aids the controls engineer in placing sensors and actuators in a linear system to best achieve a set of variance specifications on the outputs and inputs of the system. The term best achieve has been defined to be the sensor and actuator configuration which enables a controller to do either of the following: Meet the input specifications while minimizing a sum of output variances normalized by their specification (i.e. input-constrained solution), or meet the output specifications while minimizing a sum of input variances normalized by their specification (i.e., output-constrained solution). The approach taken to solve this sensor and actuator selection (SAS) problem was to use LQG (Linear Quadratic Gaussian) theory to specify a structure for the controller, and then develop an algorithm (SASLQG) that places sensors and actuators in this controller structure to achieve either the input-constrained or output-constrained solution. The main advantage of this approach is the mathematical ease which LQG theory addresses variance constraints, and the main disadvantage is that there may be other controller structures which do better. GRA

N84-17932# Tel-Aviv Univ. (Israel). Inst. of Business.
MUTUAL ADAPTIVENESS OF MAN AND MACHINE IN INFORMATION ACQUISITION TASKS Final Technical Report
M. Ben-Bassat Aug. 1983 29 p
(Contract DAJA37-81-C-0065; DA Proj. 2Q1-61102-B-74-D)
(AD-A135449; ARI-TR-575) Avail: NTIS HC A03/MF A01

Efforts were directed toward the followng tasks: survey and organize a list of analytic feature evaluation functions for use in information acquisition tasks; formulate military situation assessment tasks as hierarchical multiperspective pattern classification problems, and develop an approach for a decision support system for situation assessment; design, develop, and test the Information Acquisition software by which computer-based simulation of behavioral and analytical information acquisition strategies may be investigated; and design, develop and test the INFOACQ. EXP software which tracks information acquisition strategies employed by human decision maker in sequential classification tasks. GRA

N84-17933# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.
ROBOTIC TECHNOLOGY APPLIED TO ARMY MOBILITY SYSTEMS
R. J. Chavez, C. A. Amazeen, and H. L. Keller Jul. 1983 56 p
(DA Proj. 1L1-62733-AH-20)
(AD-A134728; AD-E301230; MERADCOM-2387) Avail: NTIS HC A04/MF A01 CSCL 09/2

Recognizing that the U.S. Army Corps of Engineers has a need for applying industrial robotic technology to high-risk and labor intensive tasks performed in the environment of a modern battlefield, USAMERADCOM started a small investigative project in a specific robotic application area--robotics applied to rapid excavation. The excavator used was a modified J. I. Case Model 35 Backhoe mounted on a highly mobile Mercedes Unimog truck. The conditions of the modern battlefield make rapid excavation extremely hazardous to the human operators due to the advent of highly accurate, technologically sophisticated weapons systems and the possibility of nuclear, biological, and/or chemical contamination of the battlefield environment. The goal, then, of the project was to eliminate or reduce through automation as much of the manual digging operation of the backhoe as would be consistent with current operating procedures. This report describes the system design and modifications associated with the implementation of a hierarchical 8-bit microprocessor control structure to the backhoe excavation cycle. The feedback control structure associated with driving a third order system consisting of electro-hydraulic values, microprocessors, optical encoders, and inertial loads is described along with an analysis of the predicted transient response. GRA

N84-17934# Carnegie-Mellon Univ., Pittsburgh, Pa. Robotics Inst.
MYOPIC HEURISTICS FOR THE WEIGHTED TARDINESS PROBLEM ON IDENTICAL PARALLEL MACHINES Interim Report
R. M. V. Rachamadugu and T. E. Morton 15 Aug. 1983 28 p
(AD-A134934; CMU-RI-TR-83-17) Avail: NTIS HC A03/MF A01 CSCL 12/1

The authors study the problem of scheduling jobs on parallel identical machines to minimize weighted tardiness. There are no known heuristics for this problem. The heuristic rule developed is simple. It can be used in the dispatch mode which makes it very practical. Characterizations of optimal solutions are presented. Computational results show that the myopic heuristic performed well vis-a-vis other rules such as the Earliest Due Date Rule, Weighted Shortest Processing Time Rule and two versions of Montagne's Rule. Reported are computational results and also the performance of the heuristic in comparison to high computational benchmarks. Author (GRA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N84-17935 Iowa Univ., Iowa City.
TEMPORAL FINITE ELEMENTS BASED ON A MINIMUM PRINCIPLE FOR INITIAL VALUE PROBLEMS Ph.D. Thesis
Sachio Nakamura 1983 160 p
Avail: Univ. Microfilms Order No. DA8325168

A symmetric, convex functional is presented whose necessary conditions for minimization are the differential equations of motion and appropriate initial conditions. A temporal finite element method is developed by discretizing this functional, using shape functions in a manner analogous to the development of spatial finite elements. The equations of motion for a linear dynamic system are thus reduced to a set of linear algebraic equations. The resulting coefficient matrix is large but very sparse and well structured. A computational technique is developed that takes advantage of the special structure of this matrix to collapse its nonzero elements into a narrow band, to increase solution efficiency. The resulting dynamic analysis technique is stable for arbitrary time discretizations and works well for stiff systems. Convergence is uniform and even in a global sense. That is, the error at the final time point is no greater than the error anywhere else in the global time interval. Computational examples are presented to compare this technique with various integration techniques. Examples include multiple degree of freedom particle problems and a spatial finite element discretized beam. Dissert. Abstr.

N84-17936*# PEDA Corp., Palo Alto, Calif.
UNIVERSAL SINGLE LEVEL IMPLICIT ALGORITHM FOR GASDYNAMICS
C. K. Lombard and E. Venkatapthy Jan. 1984 47 p refs
(Contracts NAS2-11504; F49629-83-C-0084)
(NASA-CR-166531; NAS 1.26:166531) Avail: NTIS

HC A03/MF A01 CSCL 12A

A single level effectively explicit implicit algorithm for gas-dynamics is presented. The method meets all the requirements for unconditionally stable global iteration over flows with mixed supersonic and supersonic zones including blunt body flow and boundary layer flows with strong interaction and streamwise separation. For hyperbolic (supersonic flow) regions the method is automatically equivalent to contemporary space marching methods. For elliptic (subsonic flow) regions, rapid convergence is facilitated by alternating direction solution sweeps which bring both sets of eigenvectors and the influence of both boundaries of a coordinate line equally into play. Point by point updating of the data with local iteration on the solution procedure at each spatial step as the sweeps progress not only renders the method single level in storage but, also, improves nonlinear accuracy to accelerate convergence by an order of magnitude over related two level linearized implicit methods. The method derives robust stability from the combination of an eigenvector split upwind difference method (CSCM) with diagonally dominant ADI(DDADI) approximate factorization and computed characteristic boundary approximations. Author

N84-17937# Mathematisch Centrum, Amsterdam (Netherlands).
EISENSTEIN SERIES ON THE METAPLECTIC GROUP: AN ALGEBRAIC APPROACH
G. F. Helminck 1983 91 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-161; ISBN-90-6196-257-9) Avail: NTIS HC A05/MF A01

The metaplectic group, properties of Mp(k sub v) and Mp(A), dependence of tau, theta series, Einstein series, Hecke algebras, decomposition of S(chi (m)) in the ral case, Whittaker models in the real case, the imaginary case, generalities about algebraic representations, the D(k)-module structure of S(chi (m)) sub 1, computation of M(nu (2)chi/cm)) tau x M(chi (m)), Whittaker models, mesomorphic continuation of the Fourier coefficients, convergence of the sum of the Fourier coefficients, the residue of the Einstein series in s = 3/2, and the functional equation of the Einstein series are discussed. N.W.

N84-17938# Mathematisch Centrum, Amsterdam (Netherlands).
ABSTRACT AUTOMATH
A. Rezus 1983 207 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-160; ISBN-90-6196-256-0) Avail: NTIS HC A10/MF A01

A theoretical aspect of the main AUTOMATH systems, that is, the possibility of 'separating' the 'lambda-calculus-free' part from a 'full Aut-system is discussed. Well-formedness and correctness in language definition are addressed. PA-separation and global structure of correctness are also addressed. N.W.

N84-17939# Mathematisch Centrum, Amsterdam (Netherlands).
TESTS FOR PREFERENCE
J. J. Dik 1983 171 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-162; ISBN-90-6196-259-5) Avail: NTIS HC A08/MF A01

Theorems; consistency, asymptotic distinctions and power; asymptotic relative efficiencies; special cases and practices; expectation and variance; choice of a quadratic form; numerical results are provided. Author

N84-17940# Mathematisch Centrum, Amsterdam (Netherlands).
MARKOV DECISION PROCESSES WITH CONTINUOUS TIME PARAMETER
F. A. VanDerDuynSchouten 1983 210 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-164; ISBN-90-6196-261-7) Avail: NTIS HC A10/MF A01

Probability theory on metric spaces, Markov decision drift processes on J(o, infinity), equivalent policies, cost functionals on J (0, infinity), an M/M/1 queuing model, a maintenance replacement model, and an inventory model are discussed. N.W.

N84-17941*# Columbia Univ., New York. Dept. of Applied Physics and Nuclear Engineering.
INTRINSIC ADAPTIVE MESH TECHNIQUES Final Report, 1 Apr. - 31 Oct. 1983
Peter R. Eiseman and C. K. Chu 31 Oct. 1983 6 p refs
(Grant NAG1-355)
(NASA-CR-175375; NAS 1.26:175375) Avail: NTIS HC A02/MF A01 CSCL 12A

An alternating direction adaptive grid movement code was developed and a thesis angular meshes was directed. The alternating direction code was also established on the NASA Langley computer system and is available for use there. In essence, grid points are moved on an abstract surface above physical space by means of alternating coordinate directions. The abstract surface is formed with the salient solution properties if they can be extracted by a priori physical reasoning; or otherwise, in the absence of such reasoning, by the use of error estimates in some chosen norm. Upon formulation, all important driving properties for adaptive purposes are consolidated into one object - the abstract surface. At a basic level, a uniform distribution of surface points is equivalent to gradient resolution. This arises from a projection back down into physical space. At a higher level, a more accurate view of the abstract surface is obtained when changes in surface direction are also resolved. The appropriate measure for direction changes is normal curvature. It is defined as the rate of change of surface tangent planes as a surface coordinate curve is transversed in uniform increments of arc length. Author

N84-17942# San Diego State Univ., Calif. Dept. of Mathematical Sciences.
SIGNAL DETECTION FOR SAME-SHAPE FAMILIES OF NON-HOMOGENEOUS POISSON PROCESSES
R. Lui, C. B. Bell, L. Gavin, J. Moser, and E. Pugh Sep. 1983 66 p
(Contract N00014-80-C-0208)
(AD-A135032; Rept-4-83) Avail: NTIS HC A04/MF A01 CSCL 12/1

Non-Gaussian signal detection problems are treated in the context of same-shape families of non-homogeneous Poisson processes. The ratio of mean functions of two processes in such a family is a constant. Five different signal detection problems and five different sampling protocols are considered. Optimal procedures based on minimal sufficient statistics are developed. Author (GRA)

N84-17943# Technion - Israel Inst. of Tech., Haifa.
ON MODIFICATIONS OF THE ZAKHAROV EQUATION FOR SURFACE GRAVITY WAVES
Michael Stiassnie and Lev Shemer (MIT) Jul. 1983 42 p
(Contract DAJA37-82-C-0300; DA Proj. 1T1-61102-BH-57)
(AD-A135050) Avail: NTIS HC A03/MF A01 CSCL 12/1

Zakharov integral equation for surface gravity waves is modified to include higher order (Class II) interactions, for water of constant (finite or infinite depth). This new equation is used to study some aspects of Class I and Class II instabilities of a Stokes wave. Author (GRA)

N84-17944# Massachusetts Inst. of Tech., Cambridge. Statistics Center.
MAXIMUM LIKELIHOOD RECONSTRUCTION IN EMISSION TOMOGRAPHY WITH TIME-OF-FLIGHT INFORMATION: A LIMITED STUDY
L. Kaufman, S. Morgenthaler, and Y. Vardi Oct. 1983 20 p
(Contract N00014-75-C-0555)
(AD-A135061; TR-ONR-33) Avail: NTIS HC A02/MF A01 CSCL 12/1

The maximum likelihood reconstruction for positron emission tomography (PET) and its use in connection with time-of-flight (TOF) tomography are reviewed and the issue of trade-off between information and data (that is, time of flight information vs. additional

coincidence count data) is explained. The maximum likelihood technique is then used to qualitatively assess this trade-off by means of visually comparing reconstructions. Specifically, the authors use computer simulation to generate data of PET experiments with a fixed emission density Lambda and with varying amounts of TOF information and total coincidence count data. The maximum likelihood technique is then used to reconstruct Lambda on the bases of these data sets and the different reconstructions are displayed and compared. GRA

N84-17945# Brown Univ., Providence, R. I.
ESTIMATION TECHNIQUES FOR TRANSPORT EQUATIONS
H. T. Banks, P. L. Daniel, and P. M. Kareiva Jul. 1983 14 p
(Grants NSF MCS-82-05335; AF-81-0198; AF Proj. 2304)
(AD-A135092; LCDS-83-23; AFOSR-83-0906TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The authors present convergence arguments for algorithms developed to estimate spatially and/or time dependent coefficients and boundary parameters in general transport (diffusion, advection, sink/source) models in a bounded domain Omega C R sub 2. A brief summary of numerical results obtained using the algorithms is given. Author (GRA)

N84-17946# Brown Univ., Providence, R. I.
ESTIMATION OF TEMPORALLY AND SPATIALLY VARYING COEFFICIENTS IN MODELS FOR INSECT DISPERSAL
H. T. Banks, P. K. D. Lamm, and P. M. Kareiva Jun. 1983 30 p
(Grants AF-AFOSR-0198-81; NSF MCS-82-05335; NSF DEB-82-07117; AF Proj. 2304)
(AD-A135093; LCDS-83-14; AFOSR-83-0927TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

The authors describe techniques for estimating temporally and spatially dependent parameters (including coefficients) that appear in general transport models. Convergence properties of the resulting algorithms are given and sample computational findings with test examples are presented. The authors conclude with a summary of their use of the methods analyzing experiments on the movements of marked flea beetles in cultivated arrays of the cole crop, collards (Brassica oleraceae). Author (GRA)

N84-17947# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPLINE-BASED ESTIMATION TECHNIQUES FOR PARAMETERS IN ELLIPTIC DISTRIBUTED SYSTEMS
H. T. Banks (Brown Univ.), P. L. Daniel (Southern Methodist Univ.), and E. S. Armstrong Jun. 1983 19 p
(Grant AF-AFOSR-0198-81; AF Proj. 2304)
(NASA-TM-85439; NAS 1.15:85439; AD-A135109; LCDS-83-22; AFOSR-83-0926TR) Avail: NTIS HC A02/MF A01 CSCL 12A

Parameter and state estimation techniques are discussed for an elliptic system arising in a developmental model for the antenna surface in the Maypole Hoop/Column antenna. A computational algorithm based on spline approximations for the state and elastic parameters is given and numerical results obtained using this algorithm are summarized. Author (GRA)

N84-17948# Columbia Univ., New York.
NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS AND RELATED PROBLEMS OF PADE APPROXIMATIONS Interim Report, 30 Jun. 1982 - 29 Jun. 1983
L. Bers, D. V. Chudnovsky, and G. V. Chudnovsky Oct. 1983 7 p
(Grant AF-AFOSR-0190-81; AF Proj. 2304)
(AD-A135110; AFOSR-83-0955TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

During this period the two investigators produced seven papers with titles including, Painleve Property and Multicomponent Isospectral Deformation Equations, Algebraic Reductions of Scalar Three-Dimensional Systems, Topological and Algebraic Structure of Linear Problems Associated With Completely Integrable Systems, and Laws of Composition of Backlund Transformations and the Universal Form of Completely Integrable Systems in Dimensions Two and Three. This report summarizes progress in these areas during this period supported by the grant. Author (GRA)

N84-17949# Massachusetts Inst. of Tech., Cambridge.
AN ALGEBRAIC APPROACH TO ANALYSIS AND CONTROL OF TIME-SCALES
X. C. Lou, G. C. Verghese, A. S. Willsky, and M. Vidyasagar Oct. 1983 15 p Prepared in cooperation with Waterloo Univ. (Ontario). Dept. of Electrical Engineering.
(Grant AF-82-0258; AF Proj. 2304)
(AD-A135115; LIDS-P-1335; AFOSR-83-0954TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The structure of time-scales in systems of the form x = A(epsilon)x is related to the invariant factors of A(epsilon) when this matrix is over the ring of functions analytic at 0. This relationship motivates the study of invariant factor assignment in the matrix A(epsilon) + B(epsilon) K(epsilon) by choice of K(epsilon). Results on this problem have implications for assignment of timescales by state feedback in systems of the form x = A(epsilon)x + B(epsilon)u. Work in this direction is presented. Author (GRA)

N84-17950# Washington Univ., Seattle.
[NONLINEAR RESONANCE] Final Report, 16 Jul. 1982 - 15 Jul. 1983
J. Kevorkian Aug. 1983 7 p
(Grant AF-AFOSR-0175-80; AF Proj. 2304)
(AD-A135117; AFOSR-83-0944TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

During the period of this grant the investigators addressed nonlinear resonance and interactions involving systems of nonlinear ordinary differential equations with slowly varying coefficients. More specifically, they investigated passage through resonance, sustained resonance as in roll resonance, particle accelerators or free electron lasers, global adiabatic invariants and weakly nonlinear wave interactions. Approaches used included matching asymptotic expansions, multiple scale expansions, higher order averaging, the Melnikov method and near identity canonical transformations to obtain global adiabatic invariants. Author (GRA)

N84-17951# Kentucky Univ., Lexington. Dept. of Mathematics.
ALGORITHMS, MODELING AND ESTIMATION FOR LINEAR SYSTEMS Final Technical Report, 1 Apr. 1979 - 31 May 1983
A. Lindquist May 1983 27 p
(Grant AF-AFOSR-3519-78; AF Proj. 2304)
(AD-A135134; AFOSR-83-0878TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

Modeling of linear stochastic systems leads to the stochastic realization problem. In this project the author develops a comprehensive theory of stochastic realization. Such a theory should be the center-piece of stochastic systems theory. First he studies the problem from a coordinate-dependent point of view. Secondly, he develops a geometric theory of Markovian representation, which also accomodates infinite-dimensional systems. In this framework a unified theory of smoothing is provided, the basic idea being to embed the given stochastic system in a class of similar systems all having the same output process and the same Kalman-Bucy filter. This approach provides stochastic interpretations of many important smoothing procedures. The factorizations of the matrix Riccati equation underlying fast (non-Riccati) algorithms are analized in the context of Hamiltonian systems, and certain aspects of the algebraic Riccati equation are studied, as is the concept of invariant directions of the matrix Riccati equation. A unified approach to the partial realization problem is taken, incorporating ideas from numerical linear algebra. Also studied are questions of stability of partial realizations. Finally, a statistical approach to stochastic optimization is presented, and convergence results for algorithms based on stationary data are obtained. GRA

N84-17952# Wisconsin Univ., Madison. Dept. of Mathematics.
[CONTROL THEORY OF HYPERBOLIC SYSTEMS] Final Report
D. L. Russell Jul. 1983 52 p
(Grant AF-AFOSR-0018-79; AF Proj. 2304)

(AD-A135146; AFOSR-83-0881TR) Avail: NTIS HC A04/MF A01 CSCL 14/2

The author review various aspects of the control theory of hyperbolic systems, including controllability, stabilization, control canonical form theory, etc. To allow a unified and not excessively technical treatment, attention is restricted to the case of a single space variable; the multi-dimensional case is treated in another work. The paper concludes with a short discussion of the newly developed procedure of canonical augmentation. Author (GRA)

N84-17953# Duke Univ., Durham, N. C. Dept. of Computer Science.

SEARCH ALGORITHMS AND THEIR IMPLEMENTATION Annual Report, 30 Jun. 1982 - 29 Jun. 1983

D. W. Loveland Aug. 1983 16 p

(Grant AF-AFOSR-0221-81; AF Proj. 2304)

(AD-A135154; AFOSR-83-0932TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Research that has resulted in completed papers includes perfect information games of chance, non-minimax search strategies, limited resource search and knowledge evaluation in expert systems. Preliminary results have been obtained in areas including parallel search algorithms, test-and-treatment problems and search using expectation. Other investigations are in progress.

Author (GRA)

N84-17954# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

LINEAR AND NONLINEAR FILTERING AND RELATED INVERSE SCATTERING PROBLEMS Interim Technical Report, 15 Mar. 1982 - 14 Mar. 1983

Samjoy K. Mitter and Bernard Levy May 1983 18 p

(Grant AF-AFOSR-0135-82; AF Proj. 2304)

(AD-A135175; AFOSR-83-0982TR) Avail: NTIS HC A02/MF A01 CSCL 09/4

This report discusses progress made on linear and non-linear filtering theory during the grant period. The two aspects of research included: stochastic control interpretation of non-linear filtering and its implication on approximate non-linear filtering, especially a rigorous analysis of the extended Kalman filter; and scattering and inverse scattering interpretation of linear estimation and development of new algorithms for linear estimation. GRA

N84-17955# Michigan Univ., Ann Arbor. Dept. of Mathematics.

APPLICATIONS OF NON-SELF-ADJOINT OPERATOR THEORY TO THE SINGULARITY EXPANSION METHOD (SEM) AND TO THE EIGENMODE EXPANSION METHOD (EEM) IN ACOUSTIC AND ELECTROMAGNETIC PROBLEMS Final Report, 1 Jun. 1980 - 31 May 1983

Charles L. Dolph Jul. 1983 6 p

(Grant AF-AFOSR-0204-80; AF Proj. 2304)

(AD-A135177; AFOSR-83-0934TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This document contains six papers entitled: (1) On Some Mathematical Aspects of SEM (Singularity Expansion Method), EEM (Eigenmode Expansion Method) and Scattering; (2) On the Singularity and Eigenmode Expansion Methods; (3) Mathematical Foundations of the Singularity and Eigenmode Expansion Methods; (4) Convergence of the T-Matrix Approach to Scattering Theory; (5) Convergence of the T-Matrix approach in scattering Theory, II; and (6) Variational Principles for Resonances, II. GRA

N84-17956# Utah Univ., Salt Lake City. Dept. of Chemical Engineering.

INTERNATIONAL CONFERENCE ON STIFF COMPUTATION Final Technical Report, 15 Nov. 1981 - 31 May 1983

R. C. Aiken 31 May 1983 57 p Conf. held in Park City, Utah, 12-14 Apr. 1982

(Grant AF-AFOSR-0038-82; AF Proj. 2304)

(AD-A135265; AFOSR-83-0971TR) Avail: NTIS HC A04/MF A01 CSCL 05/2

The purpose of the meeting was to examine state-of-the-art software development and theory for the numerical solution of stiff ordinary differential equations as it relates to application demands of today and tomorrow. GRA

N84-17957# Purdue Univ., Lafayette, Ind. Dept. of Statistics.

ON USING SELECTION PROCEDURES WITH BINOMIAL MODELS

S. S. Gupta and G. C. McDonald Oct. 1983 26 p

(Contract N00014-75-C-0455)

(AD-A135275; TR-83-44) Avail: NTIS HC A03/MF A01 CSCL 12/1

A subset selection procedure R for binomial populations is considered for the problem of selecting the best of k vendors whose manufacturing processes have the probabilities p sub 1,...,p sub k of turning out an item which conforms to specifications. The operating characteristics (i.e., selection probabilities and expected size of the selected subset) of this rule are related to the underlying p sub i's, the common sample size n, and d. Formulae (both exact and asymptotic) are given for these quantities for slippage as well as equi-spaced parametric configurations. Tables and graphs relating these quantities are presented for three specific slippage configurations. Numerical illustrations are given to show the use of the tables in determining the sample size n and the constant d to be used in the rule R. GRA

N84-17958# Brown Univ., Providence, R. I.

SMOOTHNESS OF BOUNDED SOLUTIONS OF NONLINEAR EVOLUTION EQUATIONS

J. K. Hale and J. Scheurle 20 May 1983 39 p

(Grant AF-AFOSR-0198-81; AF Proj. 2304; NSF MCS-82-05355)

(AD-A135294; LCDS-83-12; AFOSR-83-0905TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

It is shown, that in many cases globally defined, bounded solutions of evolution equations are as smooth (in time) as the corresponding operator, even if a general solution of the initial value problem is much less smooth; i.e., initial values for bounded solutions are selected in such a way that optimal smoothness is attained. In particular, solutions which bifurcate from certain steady states such as periodic orbits, almost-periodic orbits and also homo- and heteroclinic orbits have this property. As examples a neutral functional differential equation, a slightly damped non-linear wave equation, and a heat equation are considered. In the latter case the space variable is included into the discussion of smoothness. Finally, generalized Hopf bifurcation in infinite dimensions is considered. Here this document discusses smoothness of the bifurcation function and generalizes known results on the order of a focus. Author (GRA)

N84-17959# North Carolina Univ., Chapel Hill. Dept. of Statistics.

CONVERGENCE OF QUADRATIC FORMS IN P-STABLE RANDOM VARIABLES AND THETA SUB P-RADONIFYING OPERATORS

Stamatis Cambanis, Jan Rosinski (Case Western Reserve Univ.), and Wojbor A. Woyczynski (Case Western Reserve Univ.) Oct. 1983 22 p

(Contract F49620-82-C-0009; AF Proj. 2304)

(AD-A135314; TR-41; AFOSR-83-0975TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Necessary and sufficient conditions are given for the almost sure convergence of a quadratic form where there is a sequence of i.i.d. p-stable random variables. A connection is established between the convergence of the quadratic form and a radonifying property of the infinite matrix operator (f sub kj). Author (GRA)

N84-17960# North Carolina State Univ., Raleigh. Dept. of Software Technology.

A STOCHASTIC NETWORK FORMULATION FOR PERFORMANCE ASSESSMENT AND LIFE-CYCLE MODELING IN COMPLEX SYSTEM DESIGN

Austin J. Lemoine 25 May 1983 21 p

(Contracts DAAG29-82-K-0105; DASG60-78-L-0079; N00014-82-C-0620)

(AD-A135337; WDL-TR9954; ARO-18898.3-MA) Avail: NTIS

HC A02/MF A01 CSCL 12/1

A network model incorporating various stochastic features is considered. The model seeks to represent a complex sequential process wherein an object or system moves through a succession of states (nodes) and operating modes (classes) in the course of carrying out or fulfilling its function, and with the transitions among states and operating modes occurring in a possibly random manner, and requiring (consuming) some resource in randomly varying amounts. The authors discuss the routing behavior and resource requirements of typical objects moving through the network, evolution of the network over time when external input follows a possibly nonhomogenous Poisson pattern, the distance between the time-dependent distribution of state and the limiting distribution when the Poisson input is homogeneous, and some potential applications of the formulation and results. Author (GRA)

N84-17961# Florida State Univ., Tallahassee. Dept. of Statistics.
ESTIMATION FOR INFINITE DIMENSIONAL ORNSTEIN-UHLENBECK PROCESSES
I. W. McKeague Oct. 1983 12 p
(Contract DAAG29-82-K-0168)
(AD-A135372; FSU-STATISTICS-M674; USARO-TR-D-65; ARO-19367.8-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

The maximum likelihood estimator for parameters in the generating operator of an infinite dimensional Ornstein-Uhlenbeck process is shown to be consistent and asymptotically normal. The generating operator of the process is assumed to be in the form of a finite linear combination of fixed commuting dissipating operators and the coefficients in the linear combination represent the unknown parameters. Author (GRA)

N84-17962# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
NONPARAMETRIC SELECTION PROCEDURES FOR A TWO-WAY LAYOUT PROBLEM
Shanti S. Gupta and Lii-Yuh Leu Sep. 1983 18 p
(Contract N00014-75-C-0455)
(AD-A135385; TR-83-41) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper deals with a nonparametric subset selection procedure for a two-way layout problem. The treatment effect with the largest unknown value is of interest to us. The block effect is a nuisance parameter in this problem. The proposed procedure is based on the Hodges-Lehmann estimators of location parameters. The asymptotic relative efficiency of the proposed procedure with the normal means procedure is evaluated. It is shown that the proposed procedure has a high efficiency. Author (GRA)

N84-17963# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
DERIVATIONS OF A PRIME RING WHICH SATISFY A POLYNOMIAL IDENTITY Ph.D. Thesis - North Carolina State Univ.
D. W. Jensen 1983 79 p
(AD-A135435; AFIT/CI/NR-83-69D) Avail: NTIS HC A05/MF A01 CSCL 12/1

Document states that let lambda sub j, j=1,2,3,4, and 5 be derivations of a prime ring-R, and let Q(R) be the generalized ring of quotients of R. Assume m and n are positive integers, C is the center of Q(R), and lambda j is the unique derivation of Q(R) satisfying lambda sub j/R=lambda sub j. Several identities involving the lambda sub j's are studies and results are established. GRA

N84-17964# Naval Research Lab., Washington, D. C.
SOLITARY WAVES IN WATER COLLIDING HEAD-ON
J. M. Witting 2 Dec. 1983 18 p
(RR0-3204)
(AD-A135537; NRL-MR-5227) Avail: NTIS HC A02/MF A01 CSCL 12/1

A numerical investigation of head-on collisions of solitary waves in water shows that they reform to be solitary waves almost as before the collision, but not quite. A little energy is deposited in a dispersive wave train generated during the collision. Hence, solitary waves in water are not exactly solitons. The calculations further indicate a transition where the water at the crest attempts to fly off the surface when an identical pair of incoming waves have an amplitude/depth ratio exceeding approximately 0.45. Author (GRA)

N84-17965# State Univ. of New York, Stony Brook.
NUMERICAL SOLUTION OF SINGULAR INTEGRAL EQUATIONS ARISING IN MIXED BOUNDARY VALUE PROBLEMS OF ELASTICITY Final Report, 1 Nov. 1979 - 30 Jun. 1983
R. P. Srivastav Oct. 1983 6 p
(Contract DAAG29-80-C-0030)
(AD-A134673; ARO-16807.12-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

The central theme of this project was the development and analysis of direct methods, based on collocation for the solution of singular integral equations with a principal value integral. These equations arise in such diverse fields as linear elastic fracture mechanics, neutron transport, long water waves, image reconstruction and radiative transfer. In the classical approach, the singular integral equation is regularized to yield a Fredholm integral equation of the second kind. The numerical implementation of the regularization, is usually quite cumbersome. While direct methods are proposed by Erdogan, Erdogan and Gupta, and Theocaris and Ioakimidis have been used in Fracture Mechanic, their convergence and stability has received scant attention. The work at Stony Brook has made important strides in both directions. The author analyzed the behavior at approximate solutions enhancing our understanding of the convergence and stability of the methods based on Gaussian quadrature. He has also proposed methods which can be employed in the situations where the Gaussian quadrature-collection schemes fail. Author (GRA)

N84-17966# Naval Underwater Systems Center, Newport, R.I. Launcher Systems Dept.
NUMERICAL METHODS FOR SINGULAR PERTURBATION PROBLEMS
Quyen Huynh, Yau Shu Wong, and Liviu Lustman 1 Nov. 1983 24 p
(AD-A134696; NUSC-TR-6198) Avail: NTIS HC A02/MF A01 CSCL 12/1

Singular perturbation equations contain many of the essential difficulties of the Navier-Stokes equations. In this report the weighted-mean scheme for linear equations and the monotone difference scheme for nonlinear equations were adopted. Presented here are fast iterative techniques for solving large systems of equations that result from discretization. Numerical results are also presented for nonlinear cases using Newton's method combined with the minimal residual method. The main conclusions are that minimal residual methods with a preconditioning technique and multigrid methods with a special relaxation scheme have proved to be quite reliable and far more efficient than standard iterative methods. Author (GRA)

N84-17967# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
JOURNAL ON NUMERICAL METHODS AND COMPUTER APPLICATIONS (SELECTED ARTICLES)
Z. Jirong, Y. Yiren, S. Yuhua, L. Tang, and C. Guagnan 28 Oct. 1983 26 p Transl. into ENGLISH from Shuzhi Jisuan yu Jisuanji Yingyong (China), v. 4, no. 1, 1983 p 47-60
(AD-A134752; AD-E000550; FTD-ID(RS)T-1433-83) Avail: NTIS HC A03/MF A01 CSCL 12/1

A method of self organizing mesh with the computer is measured. In two dimension space, this method produces triangular meshes on arbitrarily shaped bodies by treating bodies as collections of quadrilateral regions. GRA

N84-17968# Naval Research Lab., Washington, D. C.
A COMPARISON OF EXPLICIT TIME INTEGRATION TECHNIQUES FOR THE FINITE ELEMENT SHOCK WAVE EQUATIONS Interim Report
E. W. Miner and R. A. Skop 30 Sep. 1983 42 p
(RR0230141)
(AD-A134757; AD-E000550; NRL-MR-5206) Avail: NTIS

HC A03/MF A01 CSCL 12/1

Numerical studies of three explicit, two-step time integration techniques for the one dimensional, finite element shock wave equations have been conducted. One of these integration techniques, the Godunov scheme, is first order accurate in time while the other, the Lax-Wendroff scheme, is second order accurate in time. The results show that overall, the best numerical solutions were obtained by the standard Godunov scheme, with either linear or parabolic spatial element. A central weighted first-step Godunov time integration provided results nearly as good. The results of the condensed mass matrix formulation were clearly not as good as the results for the full matrix. Results for the Lax-Wendroff time integration showed severe oscillations in the solution, and consequently were not as good as the Godunov time integration. The present finite element results compare quite favorably with results from standard finite-difference methods. Author (GRA)

N84-17969# North Carolina Univ., Chapel Hill. Chapel Hill Dept. of Statistics.

IDENTIFICATION OF A CLASS OF FILTERED POISSON PROCESSES

D. deBrucq 20 May 1983 9 p In FRENCH; ENGLISH summary
(Contracts N00014-75-C-0491; N00014-81-K-0373)
(AD-A134970) Avail: NTIS HC A02/MF A01 CSCL 12/1

The formulation of a model is an essential step in the experimental process of understanding a phenomenon. In this paper a new class of filtered Poisson processes is introduced: the amplitude has a low which is spherically invariant and the filter is real, linear and causal. It is shown how such a model can be identified from experimental data. Author (GRA)

N84-17970# Naval Ocean Systems Center, San Diego, Calif.

ASYMPTOTIC PROPERTIES OF EXTENDED YULE-WALKER ESTIMATES OF THE AR PARAMETERS OF AN ARMA (AUTOREGRESSIVE MOVING-AVERAGE) Interim Technical Report, Oct. 1982 - May 1983

D. F. Gingras 15 Jul. 1983 30 p
(RR0-1400)
(AD-A134981; AD-E401102; NOSC/TR-879) Avail: NTIS HC A03/MF A01 CSCL 12/1

The extended Yule-Walker equations are used to estimate the autoregressive parameters of an autoregressive moving-average time series. The asymptotic statistical properties of these estimates are derived. It is shown that they are asymptotically unbiased and normal; the covariance matrix of the limit distribution is calculated. The special case of estimating the autoregressive parameters of a noise corrupted autoregressive series is also treated.
Author (GRA)

N84-17971# Ames Lab., Iowa.

FORMULAE FOR CONFIGURATION AVERAGES OF PRODUCTS OF 1-BODY AND 2-BODY OPERATORS IN MANY-FERMION SPACES

Frank J. Margetan Nov. 1982 125 p refs
(Contract W-7405-eng-82)
(DE84-002634; IS-4815) Avail: NTIS HC A06/MF A01

The trace reduction theorems (TRT) of J. N. Ginocchio and S. Ayik have greatly simplified the evaluation of the average expectation value of an operator in a basis of many fermion states. Such averages are required for moment method calculations of the statistical properties of many fermion systems. Simplification of the practical application of the TRT is discussed. Symmetries are used to detect distinct terms which have equal contributions to the operator average, and the minimum list of formulas which need be evaluated is presented. This is done for each product of one body and two body operators having four or fewer factors. The resulting formulas are applicable to both scalar average and configuration average calculations. DOE

N84-17972# California Univ., Livermore. Lawrence Livermore Lab.

USE OF THE BERNSTEIN FORM TO DERIVE SUFFICIENT CONDITIONS FOR SHAPE PRESERVING PIECEWISE POLYNOMIAL INTERPOLATION

F. N. Fritsch Nov. 1983 15 p refs
(Contract W-7405-eng-48)
(DE84-003914; UCID-19940) Avail: NTIS HC A02/MF A01

The Bernstein form for the degree 2K-1 polynomial pieces of an Hermite spline can be used to derive sufficient conditions for shape presenting interpolation. These conditions are worked in detail for the linear, cubic, and quintic cases. DOE

N84-17973# Sandia Labs., Albuquerque, N. Mex. Computational Physics and Mechanics I Div.

L2-PROJECTION FOR TRANSFERRING DATA BETWEEN FINITE ELEMENT MESHES

Patrick F. Chavez 1984 7 p refs Presented at the 5th Intern. Symp. on Finite Element Methods in Flow Probl., Austin, Tex., 23 Jan. 1984
(Contract DE-AC04-76DP-00789)
(DE84-000063; SAND-83-0882C; CONF-840119-1) Avail: NTIS HC A02/MF A01

The L2-projection method for transferring data between different finite element function spaces is examined. Theoretical results are presented which indicate that the L2-projection conserves momentum and energy almost optimally during the transferral process for constant mass density systems. The general formulation of the L2-projection method for any given mesh data in any number of spatial dimensions or for any finite element spaces is presented. DOE

N84-17974# California Univ., Livermore. Lawrence Livermore Lab.

MATRIX-FREE METHODS IN THE SOLUTION OF STIFF SYSTEMS OF ODE'S

Peter N. Brown (Houston Univ., Tex.) and Alan C. Hindmarsh Nov. 1983 36 p refs
(Contract W-7405-eng-48)
(DE84-003361; UCID-19937) Avail: NTIS HC A03/MF A01

This is an informal preliminary report, on a study of a matrix-free method for solving stiff systems of ordinary differential equations (ODE's). In the numerical time integration of stiff ODE initial value problems by BDF methods, the resulting nonlinear algebraic system is usually solved by a modified Newton method and an appropriate linear system algorithm. In place of that, Newton's method (unmodified) is substituted and coupled with an iterative linear system method. The latter is a projection method called the Incomplete Orthogonalization Method (IOM), developed mainly by Y. Saad. A form of IOM, with scaling included to enhance robustness, is studied in the setting of Inexact Newton Methods, and implemented in a way that requires no matrix storage whatever. Tests on several stiff problems, of sizes up to 5000, show the method to be quite effective, and much more economical, in both computational cost and storage, than standard solution methods.
DOE

N84-17975# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

FUNDAMENTAL MATHEMATICAL PRINCIPLES FOR ELECTROCHEMICAL ENGINEERING

John Newman Aug. 1983 18 p refs Presented at the Natl. Meeting of the Am. Inst. Chem. Engr., Denver, 27-31 Aug. 1983
(Contract DE-AC03-76SF-00098)
(DE84-002181; LBL-16785; CONF-830859-10) Avail: NTIS HC A02/MF A01

Exceedingly complex processes can now be subjected to reasonably realistic analysis and simulation. Electrochemical processes qualify as complex because of the diverse chemistry involved and the presence of electrical variables. Consequently, we should get on with the job of modeling so that we can simulate electrochemical systems with a completeness and realism comparable to what is found in the simulation of distillation columns. In this paper we intend to expound on the philosophy of such simulation and to reiterate some of the governing mathematical basis for the physical and chemical processes with which we expect to deal. Examples will be mentioned in order to maintain some

flavor of current research problems. These include the use of semiconductor electrodes in a photoelectrochemical cell, the design of LiAl-FeS cells for electrical energy storage, and the growth of a salt film in the corrosion of iron. DOE

N84-17976# New York Univ., New York. Lab. for Mathematics and Computing.
ACCURACY OF STABLE SCHEMES FOR 2D SCALAR CONSERVATION LAWS
Jonathan B. Goodman and Randall J. LeVeque Nov. 1983 17 p refs Sponsored in part by NSF
(Contract DE-AC02-76ER-03077)
(DE84-004989; DOE/ER-03077/203) Avail: NTIS HC A02/MF A01

It is shown that any conservation scheme for solving scalar conservation laws in two space dimensions which is total variation diminishing is at most first order accurate. DOE

N84-17977*# New York Univ., New York. Lab. for Mathematics and Computing.
AUTOMATIC ADAPTIVE GRID REFINEMENT FOR THE EULER EQUATIONS
Marsha J. Berger and Antony Jameson (Princeton Univ.) Oct. 1983 27 p refs
(Grant NAG1-186; Contract DE-AC02-76ER-03077; Grant N00014-81-K-0379)
(NASA-CR-173161; NAS 1.26:173161; DE84-004988; DOE/ER-03077/202) Avail: NTIS HC A03/MF A01 CSCL 12A

A method of adaptive grid refinement for the solution of the steady Euler equations for transonic flow is presented. Algorithm automatically decides where the coarse grid accuracy is insufficient, and creates locally uniform refined grids in these regions. This typically occurs at the leading and trailing edges. The solution is then integrated to steady state using the same integrator (FLO52) in the interior of each grid. The boundary conditions needed on the fine grids are examined and the importance of treating the fine/coarse grid inerface conservatively is discussed. Numerical results are presented. DOE

N84-17978# Illinois Univ., Urbana. Dept. of Computer Science.
ALGORITHM FOR THE DETECTION AND INTEGRATION OF HIGHLY OSCILLATORY ORDINARY DIFFERENTIAL EQUATIONS USING A GENERALIZED UNIFIED MODIFIEC DIVIDED DIFFERENCE REPRESENTATION Ph.D. Thesis
Kyle A. Gallivan Jun. 1983 117 p refs
(Contract DE-AC02-76ER-02383)
(DE84-003585; UICDCS-R-83-1121; UILU-ENG-83-1712; COO-2383-0093) Avail: NTIS HC A06/MF A01

The generalized Adams and generalized BDF methods for the integration of highly oscillatory ordinary differential equations are derived as natural variable step predictor-corrector pairs. The unified modified divided difference representation is generalized for use in representing the natural variable step formulae. DOE

N84-17979# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
IMAGE ANALYSIS WITH USE OF RANGE INFORMATION
Joergen Fransson Aug. 1983 48 p refs In SWEDISH; ENGLISH summary
(FOA-C-30335-E1) Avail: NTIS HC A03/MF A01; Research Inst. of National Defence, Stockholm KR 50

The state-of-the-art in image analysis is surveyed. Experimental studies of edge detection in range images, improvement of the edges by filling up gaps, and elimination of isolated edge elements are described. The segmentation technique applied to edges is reported. The use of a ring operator for determining local characteristics of an image component, by studying the vicinity limited to a ring around the observed object is outlined. Results show that the performance of the method using edge detection and segmentation is good, providing the range image is of high quality. Author (ESA)

N84-17980# Shell Exploration and Production Lab., Rijswijk (Netherlands).
A MULTIGRID METHOD AND A COMBINED MULTIGRID-CONJUGATE GRADIENT METHOD FOR ELLIPTIC PROBLEMS WITH STRONGLY DISCONTINUOUS COEFFICIENTS IN GENERAL DOMAINS
R. Kettler (Technische Hogeschool, Delft) and J. A. Meijerink Mar. 1982 43 p refs Revised Submitted for publication
(Publ-604-Rev.) Avail: NTIS HC A03/MF A01

Two multigrid methods capable of handling large systems of linear equations that arise from discretizations of self adjoint elliptic problems with strongly discontinuous coefficients in a general domain are presented. A method based on Gauss elimination / matrix-weighted interpolation and incomplete Cholesky relaxation is described. Numerical experiments indicate that this method is highly preferable to a conventional multigrad method since performance is not degraded by discontinuities in coefficients and general domains. For an extremely ill-conditioned problem it is faster than incomplete Cholesky conjugate gradients (ICCG) (1,1) and competitive with ICCG (1,2). Coupling the multigrid and conjugate gradient methods improves the efficiency of the multigrid method, which can cope with non-self-adjoint problems too. In that case and in the case of an asymmetric multigrid scheme, the acceleration can be achieved using a bidiagonalization induced dimension reduction, or ORTHOMIN method instead of conjugate gradient techniques. Author (ESA)

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N84-17981# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
A STOPPING RULE FOR A MULTI-PERSON COOPERATIVE GAME
J. M. vanZyl and D. J. deWaal Nov. 1982 9 p refs Sponsored by CSIR
(TR-87) Avail: NTIS HC A02/MF A01

The secretary problem where the players have no prior knowledge of the objects, and they are sampling without recall, is discussed. N.W.

N84-17982*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A STUDY OF NUCLEATION AND GROWTH OF THIN FILMS BY MEANS OF COMPUTER SIMULATION: GENERAL FEATURES
Joshua Salik 1984 14 p refs Proposed for presentation at the 11th Intern. Conf. on Metall. Coatings, San Diego, Calif., 9-13 Apr. 1984; sponsored by Am. Vacuum Soc.
(NASA-TM-83559; E-1869; NAS 1.15:83559) Avail: NTIS HC A02/MF A01 CSCL 12A

Some of the processes involved in the nucleation and growth of thin films were simulated by means of a digital computer. The simulation results were used to study the nucleation and growth kinetics resulting from the various processes. Kinetic results obtained for impingement, surface migration, impingement combined with surface migration, and with reevaporation are presented. A substantial fraction of the clusters may form directly upon impingement. Surface migration results in a decrease in cluster density, and reevaporation of atoms from the surface causes a further reduction in cluster density. Author

N84-17983# Massachusetts Inst. of Tech., Cambridge. Statistics Center.
NOISE
Y. C. Yao Sep. 1983 12 p
(Contract N00014-75-C-0555)
(AD-A135066; TR-31-ONR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report explains the term 'noise' from the point of view of probability and statistics. Namely, noise is regarded as a random process. Two special cases of noise, Gaussian noise and white noise, are discussed. Author (GRA)

N84-17984# Stanford Univ., Calif.
STATISTICAL DATA PROCESSING, SYSTEM MODELING AND RELIABILITY Final Report, 1 May 1979 - 30 Jun. 1983
Thomas Kailath, Robert M. Gray, Abbas ElGamal, and Martin Morf Jun. 1983 29 p
(Contract F49620-79-C-0058; AF Proj. 2304)
(AD-A135208; AFOSR-83-0935TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

The aim of research described herein has explored several fundamental problems in statistical data processing and system modeling, with particular aspects: analysis of Nonstationary Signal Processes; algorithms for data compression; reliable VLSI computing structures; and algorithms and architectures for statistical and data processing. GRA

N84-17985# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
ISOTONIC PROCEDURES FOR SELECTING POPULATIONS BETTER THAN A STANDARD: TWO-PARAMETER EXPONENTIAL DISTRIBUTIONS
S. S. Gupta and L. Y. Leu Oct. 1983 28 p
(Contract N00014-75-C-0455)
(AD-A135445; TR-83-46) Avail: NTIS HC A03/MF A01 CSCL 12/1

The problem of selecting populations from two-parameters exponential populations which are better than a standard under an ordering prior is investigated. If the negative exponential distribution is the model for lifetime, then the problem is to select all those populations for which the guarantee lifetimes are larger than that of a standard. Comparisons of these procedures based on the expected number of bad populations in the selected subset is investigated. Tables of associated constants for the proposed procedures are given. Author (GRA)

N84-17986# Texas Univ., Austin. Austin Dept. of Computer Sciences.
PRESERVING ASYMMETRY BY SYMMETRIC PROCESSES AND DISTRIBUTED FAIR CONFLICT RESOLUTION Interim Report
K. M. Chandy and J. Misra Apr. 1983 13 p
(Grant AF-AFOSR-0205-81; AF Proj. 2304)
(AD-A135458; AFOSR-83-0990TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

Conflicts arising in distributed systems, as in contentions for shared resources, are resolved either by a central process or by resorting to probabilistic decision making by individual processes or by assigning a static global priority to each process. All known non-probabilistic solutions to the conflict resolution problem are asymmetric in the sense that they distinguish between processes by ordering process ids of by having some processes carry out special functions. We propose an efficient, fair, symmetric solution for this problem: asymmetry is present initially by judicious placement of shared resources and asymmtery is preserved in a fair manner by our solutions. To provide a concrete framework for our discussion of conflict resolution we couch our discussion in terms of a generalization of the classical dining philospher's problem. GRA

N84-17987# California Univ., Berkeley. Operations Research Center.
A BAYESIAN EXPLANATION OF AN APPARENT FAILURE RATE PARADOX
R. E. Barlow Oct. 1983 11 p
(Contract DAAG29-81-K-0160)
(AD-A134748; ORC-83-13; ARO-18195.5-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

For the exponential life distribution model and any prior distribution for the failure rate parameter, the predictive distribution has a decreasing failure rate. The author gives a Bayesian explanation of why this is logically reasonable. Author (GRA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N84-17988*# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
DETECTION OF ABRUPT CHANGES IN DYNAMIC SYSTEMS
Alan S. Willsky Jan. 1984 23 p refs
(Grant NGL-22-009-124; Contract N00014-77-C-0224)
(NASA-CR-173217; NAS 1.26:173217; LIDS-P-1351) Avail: NTIS HC A02/MF A01 CSCL 12B

Some of the basic ideas associated with the detection of abrupt changes in dynamic systems are presented. Multiple filter-based techniques and residual-based method and the multiple model and generalized likelihood ratio methods are considered. Issues such as the effect of unknown onset time on algorithm complexity and structure and robustness to model uncertainty are discussed. Author

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N84-17989# Mathematisch Centrum, Amsterdam (Netherlands).
THE COVARIANT CLASSIFICATION OF TWO-DIMENSIONAL SMOOTH COMMUTATIVE FORMAL GROUPS OVER AN ALGEBRAICALLY CLOSED FIELD OF POSITIVE CHARACTERISTIC
H. A. W. M. Kneppers 1983 89 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-157; ISBN-90-6196-252-8) Avail: NTIS HC A05/MF A01

Some generalities in the covariant formal group theory are introduced. In this theory, the central place is taken by the group of p typical curves in a formal group. The covariant technique gives rise to some new isomorphism invariants of finite dimensional smooth commutative formal groups over an algebraically closed field of positive characteristic. For dimension two, an explicit classification up to isomorphism is obtained. The methods which have led to this result may in principle be extended to higher dimensions. The covariant classification of the two dimensional formal groups is compared with the existing contravariant classification of the same class of formal groups, due to Manin. The covariant classification turns out to be finer and more explicit than its contravariant counterpart. Nevertheless, the covariant techniques are relatively elementary, the preformation of the classification is less laborious and the arrangement of the results is more clear. The concept of a special module, which plays an important role in the contravariant theory, is generalized. This generalization leads to a refinement of the contravariant classification. It seems hard, however, to make the contravariant classification more explicit. Finally, an application of the covariant classification theory in algebraic geometry is given: The computation of the isomorphism invariants of the formal group arising from the Jacobian of a generic curve of genus two over an algebraically closed field of characteristic 2. These isomorphism invariants are, of course, birational invariants. Author

N84-17990# Mathematisch Centrum, Amsterdam (Netherlands).
COMPUTATIONAL METHODS IN NUMBER THEORY, PART 1
H. W. Lenstra, Jr., ed. and R. Tijdeman, ed. 1982 213 p refs 2 Vol.
(Math-Centre-Tracts-154-Pt-1; ISBN-90-6196-248-X) Avail: NTIS HC A10/MF A01

Topics related to computational techniques in number theory are addressed. Primality testing, machine models and computational complexity, fast arithmetic operations, perfect numbers, and factorization algorithms for integers and polynomials are discussed. In addition, a public-key cryptosystem is described. For individual titles, see N84-17991 through N84-17998.

N84-17991# Amsterdam Univ. (Netherlands). Inst. voor Sinterdisciplinaire Wiskunde.
MACHINE MODELS, COMPUTATIONAL COMPLEXITY AND NUMBER THEORY
P. vanEmdeBoas *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 1 1982 p 7-42 refs (For primary document see N84-17990 08-67)
Avail: NTIS HC A10/MF A01

The basic ideas of the theory of machine models, computational complexity, and number theory are defined and their interrelatedness examined. Turing, Register, and other machine models are discussed with reference to their recursive equivalence. Also addressed are time and space complexity, the halting problem, the fundamental complexity classes, Cook's theorem and the existence of NP-complete sets, and Diophantine problems. M.G.

N84-17992# Erasmus Univ., Rotterdam (Netherlands). Econometrisch Inst.
FAST ARITHMETIC OPERATIONS ON NUMBERS AND POLYNOMIALS
J. W. M. Turk *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 1 1982 p 43-54 refs (For primary document see N84-17990 08-67)
Avail: NTIS HC A10/MF A01

Some methods for computing the product or quotient of two given integers or two given polynomials are discussed as well as a method for evaluating a given polynomial at given points. The methods reduce the operations to a number of elementary operations such as the addition or multiplication of binary digits. The main feature of the methods is that they are designed to minimize the number of elementary operations asymptotically. M.G.

N84-17993# Amsterdam Univ. (Netherlands). Mathematisch Inst.
PRIMALITY TESTING
H. W. Lenstra, Jr. *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 1 1982 p 55-77 refs (For primary document see N84-17990 08-67)
Avail: NTIS HC A10/MF A01

The problem of determining primality in elementary number theory is addressed which can be stated as: given an integer $N > 1$, how can one tell whether N is prime or composite. The efficiency of testing algorithms and proofs of supporting theorems are discussed. M.G.

N84-17994# Philips Data Systems B. V., Apeldoorn (Netherlands).
FACTORIZATION ALGORITHMS OF EXPONENTIAL ORDER
M. Voorhoeve *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 1 1982 p 79-87 refs (For primary document see N84-17990 08-67)
Avail: NTIS HC A10/MF A01

The fastest algorithms known for the factorization of an integer N require a time and memory proportional to a powr of L, where L = exp(square root of(log N loglogN)). The discussion is limited to the algorithms that are O(N (alpha)), where alpha is a fixed positive real number. Since the length of the input of the factorization problem is log N, these are the 'purely exponential' algorithms. Although slower than the L (alpa) algorithms, the N(alpha) algorithms have the advantage of simplicity. Any factorization attempt of a number N should start with a search for small factors by trial division. Once the small divisors are eliminated, the remaining quotient must be tested for primality. After these tests, when it is known that N is not prime and has no small divisors, only then is it worthwhile to unchain the heavy machinery that are the L(alpha) algorithms. Even then the simple methods can be useful, as is demonstrated by the factorization of 2(256) + 1 by the Pollard-rho method. The algorithms are discussed in order of increasing asymptotic speed and thus decreasing alpha: trial division, Sherman Lehman, Rivest-Pinter, Lenstra, Pollard-rho, Lehmer-Powers, Pollard-Strassen, and Shanks class group. M.G.

N84-17995# Georgia Univ., Athens. Dept. of Mathematics.
ANALYSIS AND COMPARISON OF SOME INTEGER FACTORING ALGORITHMS
C. Pomerance *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 1 1982 p 89-139 refs Sponsored in part by NSF (For primary document see N84-17990 08-67)
Avail: NTIS HC A10/MF A01

The running times of some integer factoring algorithms and how certain variations affect these times are analyzed. The basic algorithms discussed include the Dixon, Morrison-Brillhart (continued fraction), and Schroeppel (linear sieve) techniques. In addition, a new algorithm called the quadratic sieve is proposed. It appears to be very fast and is based on the fact that the consecutive values of a quadratic polynomial can be factored with a sieve. M.G.

N84-17996# Mathematisch Centrum, Amsterdam (Netherlands).
PERFECT NUMBERS AND ALIQUOT SEQUENCES
H. J. J. teRiele *In its* Computational Methods in Number Theory, Pt. 1 1982 p 141-157 refs (For primary document see N84-17990 08-67)
Avail: NTIS HC A10/MF A01

The main developments in the study of perfect numbers and aliquot sequences since the advent of high speed computers are reviewed. Amicable number pairs, periodic aliquot sequences of period length > 2, and non-periodic aliquot sequences are addressed along with the problem of the existence of unbounded sequences. M.G.

N84-17997# Mathematisch Centrum, Amsterdam (Netherlands).
ON A SECURE PUBLIC-KEY CRYPTOSYSTEM
P. J. Hoogendoorn *In its* Computational Methods in Number Theory, Pt. 1 1982 p 159-168 refs (For primary document see N84-17990 08-67)
Avail: NTIS HC A10/MF A01

One way to solve problems of security in electronic communication systems is the use of cryptosystems: mathematical systems for encrypting, or transforming information so that it is unintelligible and therefore useless to those who are not meant to have access to it. A secure public-key cryptosystem, the RSA, is discussed. In a public-key cryptosystem the sender and the receiver (rather than agreeing on a single secret key for the two of them) each generate two distinct keys of their own: an enciphering key, which serves to implement the system's enciphering algorithm, and a deciphering key, which serves to implement the system's deciphering algorithm. Together with the enciphering algorithm each user puts his enciphering key in a public file, whereas he keeps his deciphering key secret. The keys are related in the sense that they serve to implement inverse operations: operating on a ciphertext message first with the transformation specified by the enciphering key and then with the transformation specified by the deciphering key reproduces the message; and in some (but not all) systems applying the transformations in the reverse order also reproduces the message. The system is called secure if it is computationally infeasible to derive the decryption key from the encryption key. M.G.

N84-17998# Mathematisch Centrum, Amsterdam (Netherlands).
FACTORIZATION OF POLYNOMIALS
A. K. Lenstra *In its* Computational Methods in Number Theory, Pt. 1 1982 p 169-198 refs (For primary document see N84-17990 08-67)
Avail: NTIS HC A10/MF A01

An overview of the most important algorithms for factoring univariate polynomials over finite fields, over the integers, and over algebraic number fields is given. For problems concerning polynomials over finite fields, algorithms for square-free decomposition and partial factorization, root-finding, complete factorization, and deciding irreducibility are presented. The factorization over a finite field IF(q) can be extended to the factorization over a certain ring W(k) (IF(q)) containing q(k) elements, for a given value of k. Several algorithms to perform this so-called lifting of a factorization are described. As a result, reasonably efficient algorithms for

factoring univariate polynomials over the integers and over algebraic number fields are formulated. Finally, a very short description of the algorithms for factoring multivariate polynomials is given. M.G.

N84-17999# Mathematisch Centrum, Amsterdam (Netherlands).
COMPUTATIONAL METHODS IN NUMBER THEORY, PART 2
H. W. Lenstra, Jr., ed. and R. Tijdeman, ed. 1982 220 p refs 2 Vol.
(Math-Centre-Tracts-155-Pt-2; ISBN-90-6196-249-8) Avail: NTIS HC A10/MF A01

Computational methods in number theory were examined. The following topics are discussed: computation of Galois groups; class numbers and units; quadratic fields and factorization; multidimensional combined fraction algorithms; numerical computation of special zeros of partial sums of Riemann's zeta function. For individual titles, see N84-18000 through N84-18006.

N84-18000# Amsterdam Univ. (Netherlands). Mathematisch Inst.
THE COMPUTATION OF GALOIS GROUPS
F. J. vanderLinden *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 2 1982 p 199-211 refs (For primary document see N84-17999 08-67)
Avail: NTIS HC A10/MF A01

The existing techniques to determine the Galois group of G with the help of an electronic computer is discussed. For G this means that is it a transitive subgroup of S sub n. Two major methods for the computation of G are presented. The first one does not compute G in all cases, but it leaves us sometimes with a choice between several subgroups of S sub n. The Riemann hypotheses method has the advantage that essentially the same program can be used for different values of n. The second method determines G always, but multiprecision real and integral arithmetic is used, and for different values of n different programs are used. E.A.K.

N84-18001# Amsterdam Univ. (Netherlands). Mathematisch Inst.
CLASS NUMBERS AND UNITS
H. Zantema *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 2 1982 p 213-234 refs (For primary document see N84-17999 08-67)
Avail: NTIS HC A10/MF A01

Every nonzero rational number-q has a unique expression where epsilon = + or - 1 and the a(p) are integers, almost all zero. This statement embodies two properties of the ring of integers Z: it has unique factorization into primes, and secondly, that it only has "trivial" units + or - 1. Let K be an algebraic number field, i.e., a finite extension of 0. This is a subring of K, the ring of integers of K. From Gauss' lemma we know that 0(q) = Z. To recover uniqueness of factorization we have to pass to ideals of 0(K). Elements of I(K) are called ideals of K; ideals of 0(K) are called integral ideals. The set I(K) is an abelian group under multiplication. Every ideal a has a unique decomposition where p ranges over the nonzero prime ideals of 9(K), and a(p) e Z, almost all equal to zero. An ideal of K is called a principal ideal if it can be written as a0(K) for some a e K, a = 0; the element a is called a generator. E.A.K.

N84-18002# Leiden Univ. (Netherlands). Mathematisch Inst.
QUADRATIC FIELDS AND FACTORIZATION
R. J. Schoof *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 2 1982 p 235-286 refs (For primary document see N84-17999 08-67)
Avail: NTIS HC A10/MF A01

When is an algebraic number field and 0 = 0(K) its ring of integers? A few basic definitions and facts concerning algebraic number fields are recalled. By I(K) the group of fractional omicron ideals and by P(K) its subgroup of principal fractional omicron ideals, which is a subgroup of I(K) are denoted. The class group Cl(L) of K is defined by Cl(K) = I(K)/P(K). The class group is a finite abelian group and its order is denoted by h(K), the class number of K. By omicron to the x power the multiplicative group of units of 0 are denoted. In general, it is hard to determine the class group of a number field, which is given by a generator. The rings of integers do not contain too many units and the computation of the class group is relatively easy. It appears to be possible to determine the class group of fields with small degrees, which have very large discriminants. E.A.K.

N84-18003# Papiermolen 4, Leiden (Netherlands).
MULTI-DIMENSIONAL CONTINUED FRACTION ALGORITHMS
A. J. Brentjes *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 2 1982 p 287-319 refs (For primary document see N84-17999 08-67)
Avail: NTIS HC A10/MF A01

Multidimensional continued fraction algorithms are generalizations of the well known continued fraction algorithm. They can be used to solve a variety of Diophantine approximation problems and other problems ranging from the computation of a g.c.d. to the determination of units in algebraic orders. Their iterative nature makes these algorithms highly suited for computer implementation. These techniques are applied to the unit problem in cubic fields. E.A.K.

N84-18004# Erasmus Univ., Rotterdam (Netherlands). Econometrisch Inst.
DIOPHANTINE EQUATIONS
R. J. Stroeker and R. Tijdeman (Leiden Univ.) *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 2 1982 p 321-369 refs (For primary document see N84-17999 08-67)
Avail: NTIS HC A10/MF A01

Diophantine analysis borrows mainly from the following fields: (1) elementary number theory; (2) algebraic number theory; (3) algebraic geometry; (4) p-adic analysis; (5) diophantine approximation theory, and (6) miscellaneous theories logic, combinatorics. General results are obtained by combining (1), (2), (4) and (5). Methods for effectively determining the complete solution of diophantine equations are outlined. E.A.K.

N84-18005# Mathematisch Centrum, Amsterdam (Netherlands).
NUMERICAL COMPUTATION OF SPECIAL ZEROS OF PARTIAL SUMS OF RIEMANN'S ZETA FUNCTION
J. vandeLune and H. J. J. teRiele *In its* Computational Methods in Number Theory, Pt. 2 1982 p 371-387 refs (For primary document see N84-17999 08-67)
Avail: NTIS HC A10/MF A01

A zero s = delta + it of XiN(s) with the property delta > will be called a special zero. Up till now no special zero of any Xi sub N (s) was located numerically. Two different methods for the explicit numerical computation of special zeros of Xi sub N(s) are presented. The first method produces all special zeros of Xi sub N(s) with imaginary part in a given interval. In the second method several (vertical) almost-periods of Xi sub N(s) are computed and is attempted to find special zeros of Xi sub N(s) by adding these almost-periods to zeros of Xi sub N(s) with real part very close to delta = 1. The second method is by no means exhaustive, but it is much less time consuming than the first one. A selection of the special zeros of Xi sub N(s) for N = 19, 22(1)27, 29(1)35, 37(1)41, 47, which were actually computed by the two methods is presented. E.A.K.

N84-18006# Australian National Univ., Canberra. Dept. of Computer Science.
THE FIRST 200,000,001 ZEROS OF RIEMANN'S ZETA FUNCTION
R. P. Brent, J. vandeLune (Mathematisch Centrum), H. J. J. teRiele (Mathematisch Centrum), and D. T. Winter (Mathematisch Centrum) *In* Mathematisch Centrum Computational Methods in Number Theory, Pt. 2 1982 p 389-403 refs (For primary document see N84-17999 08-67)
Avail: NTIS HC A10/MF A01

Extensive computations by which former result to n = 156,800,001 and by which this is extended to n = 200,000,001 are reported. The range g81,000,000' g120,000,000', was also

examined. The numerical verification of the Riemann hypothesis in a given range consists of separating the zeros of the well known real function Z(t), or, equivalently, of finding sufficiently many sign changes of Z(t). The programs are based on the modification of LEHMER's method. A more efficient strategy of searching for sign changes of Z(t) in Gram blocks of length L 2 is developed. E.A.K.

N84-18007# Syracuse Univ., N. Y. Dept. of Electrical and Computer Engineering.
THE DISCRETE CONVOLUTION METHOD FOR SOLVING SOME LARGE MOMENT MATRIX EQUATIONS
H. L. Nyo and R. F. Harrington Jul. 1983 62 p
(Contract N00014-76-C-0225)
(AD-A135420; SYRU/DECE/TR-83/14; TR-21) Avail: NTIS HC A04/MF A01 CSCL 12/1

This report describes an iterative technique to solve the matrix equation formulated by the Method of Moments. The advantage is that the number of multiplicative operations required is of the order NlogN, instead of the order N sub 2 to N sub 3 required by other solution techniques. Sample computations are made for the thin wire scatterers, linear arrays, and planar arrays. The number of iterations required for a given type of problem is found to be almost independent of the size of the matrix. The largest example given in this report is for planar array with 1849 antennas, which required 4 minutes of computing time on an IBM 4341.
Author (GRA)

N84-18008# Hahn-Meitner-Institut fuer Kernforschung, Berlin (West Germany). Arbeitsgruppe Numerische und Angewandte Mathematik.
REGULAR OPERATOR APPROXIMATION THEORY
P. M. Anselone (Oregon State Univ., Corvallis) and M. L. Treuden Dec. 1982 131 p refs
(HMI-B-389) Avail: NTIS HC A07/MF A01

Approximations for linear equations in a Banach space are defined. Efficient and revealing derivations of basic convergence results are presented, and the theory is extended. The analysis is based on systematic use of convergence and compactness concepts for sequences of sets. Ideas from nonlinear operator approximation theory, which can be exploited in general approximation theory, are indicated. Author (ESA)

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N84-18009# Naval Ship Research and Development Center, Annapolis, Md. Propulsion and Auxiliary Systems Dept.
DESIGN, CONSTRUCTION AND TEST OF A 0.61-METER-DIAMETER, EPOXY IMPREGNATED SUPERCONDUCTIVE MAGNET
D. J. Waltman, M. J. Superczynski, and F. E. McDonald Oct. 1983 40 p
(F43-431)
(AD-A135339; DTNSRDC/PAS-81/18) Avail: NTIS HC A03/MF A01 CSCL 21/3

To determine the performance and quench behavior of a large, fully-potted, NbTi superconductive magnet, a 0.61-m test coil has been constructed which contains heaters, thermocouples, and strain gauges installed at various winding locations. The magnet has an inductance of 49 henries, 7502 turns of copper stabilized NbTi wire, and a magnet load-line critical point of 190 amperes at 6.5 tesla. The methods and techniques used to construct the fiber glass reinforced, epoxy impregnated magnet are described. The results of the electrical and thermal measurements of the test coil behavior for quenches initiated at various winding locations and at operating currents of up to 150 amperes are presented. The laboratory measurements results are compared to the results obtained from the QUENCH computer program simulation of this magnet to assess the program's ability to describe the actual quench behavior of the magnet. GRA

N84-18010# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FORM COEFFICIENT FOR THE FIELD OF A SUPERCONDUCTING SYNCHRONOUS MACHINE
A. I. Bertinov, A. V. Golovkin, L. A. Yegoshkina, and O. M. Mironov 21 Oct. 1983 11 p Transl. into ENGLISH from Elektrotekhn. (USSR), no. 1, Jan. 1970 p 43-46
(AD-A134751; AD-E000550; FTD-ID(RS)T-1132-83) Avail: NTIS HC A02/MF A01 CSCL 20/3

The magnetic field of a superconducting synchronous machine was considered. An expression unique for all areas is obtained for the radial component of intensity of the magnetic field, and the form coefficient of the field is determined. GRA

N84-18011# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CALCULATING THE MAGNETIC FIELD FROM A SADDLE-SHAPED COIL WITHOUT A FERROMAGNETIC CIRCUIT
L. P. Gnedin and G. G. Borzov 20 Oct. 1983 10 p Transl. into ENGLISH from Elektrotekhn. (USSR), v. 42, no. 9, Sep. 1971 p 41-44
(AD-A134776; FTD-ID(RS)T-1131-83) Avail: NTIS HC A02/MF A01 CSCL 12/1

Mathematical formulas for the components of induction of the magnetic field and the magnetic flux from a coil with saddle shaped side sections in a system without a magnetic circuit are presented. GRA

N84-18012# California Univ., Livermore. Lawrence Livermore Lab.
ULTRA-HIGH-FIELD SUPERCONDUCTING MAGNETS
R. W. Hoard, D. N. Cornish, R. M. Scanlan, J. P. Zbashnik, R. L. Leber, R. B. Hickman, and J. D. Lee Aug. 1983 47 p refs
(Contract W-7405-eng-48)
(DE84-003913; UCID-19853) Avail: NTIS HC A03/MF A01

The following topics are considered: (1) superfluid helium for advanced magnets, (2) conductor reinforcement, (3) designing a 20-T, 2-m bore solenoidal coil, (4) coil size and conductor properties, (5) axial forces on the coil, (6) effect of radiation on the coil systems, and (7) helium-2 transient heat transfer and coil protection. DOE

N84-18013# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BIMONTHLY BULLETIN NUMBER 1983-2, 213/MARCH-APRIL
Claude Sevestre, ed. Paris ESA Sep. 1983 66 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimensuel No. 1983-2, 213/Mar.-Apr. 1983 (Paris), Sep. 1983 66 p
(ESA-TT-817) Avail: NTIS HC A04/MF A01; print copy in ENGLISH available at ONERA, Paris FF60; original report in FRENCH available at ONERA, Paris FF60

Rotational flow of a weakly viscous fluid; an implicit pseudo-unsteady method for solving Euler equations in transonic flow; elastoplastic crack propagation fatigue and failure; a variational approach to conservative hyperbolic systems; modeling of a multivariable system on the basis of frequency data; and performing literal calculations with a microcomputer are discussed.
Author (ESA)

N84-18014# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE BIMONTHLY BULLETIN, NUMBER 1983-3, 214/MAY-JUNE
Claude Sevestre, ed. Paris ESA Oct. 1983 74 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimensuel (Paris), No. 1983-3, 214/May-June, 1983 p 1-72
(ESA-TT-822) Avail: NTIS HC A04/MF A01; print copy in ENGLISH available at ONERA, Paris FF60; original report in FRENCH available at ONERA, Paris FF 60

Vibrational stabilization of autonomous quadratic systems; computation of three-dimensional viscous flows on transonic wings by boundary layer-inviscid flow interaction; calculation of transonic flows around wing-fuselage combination by a subdomain decomposition approach; an exterior Neumann problem for Helmoltz equation (irregular frequencies) noise generation and propagation in shear flows; effects of airplane flight speed on turbulence and noise generation in jets; and an excitation system for wind tunnel unsteady tests on half-wing models are discussed. Author (ESA)

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N84-18015*# Oregon Graduate Center for Study and Research, Beaverton.

EVALUATION OF TURBULENCE INDUCED NOISE IN COHERENT ANTI-STOKES RAMAN SCATTERING Final Technical Report, 1 Jun. 1979 - 31 Dec. 1982

Richard A. Elliott 31 Dec. 1982 30 p refs

(Grant NsG-2387)

(NASA-CR-166544; NAS 1.26:166544) Avail: NTIS HC A03/MF A01 CSCL 20A

The effect of turbulence in a transonic wind tunnel on coherent anti-Stokes Raman scattering is considered. The driving pump and Stokes waves are taken to be coaxially propagating Gaussian beam waves which are focused on the Raman active medium through the turbulent boundary layer of the flow tube. The random index of refraction variations in the layer are modeled as phase perturbations of the driving waves which cause a reduction of the mean on-axis field and an increase in the mean diameter of the beams. Effective Gaussian beam parameters are developed and the radiated anti-Stokes power calculated as a function of the phase screen parameters. A significant reduction in signal strength occurs for realistic estimates of the phase screen parameter appropriate to a confined transonic flow. A method for estimating the signal degradation which could be applied to other experimental situations is presented. Author

N84-18016*# National Aeronautics and Space Administration, Washington, D. C.

INTRODUCTION TO ACOUSTIC EMISSION

G. Possa Jul. 1983 13 p Transl. into ENGLISH of "Introduzione all Emissions Acustica" rept. CISE-1792 Centro Informazioni Studi Esperienze, Milan, 1982 p 1-5 Original language document was announced as N83-15051 Transl. by Scientific Translation Service, Santa Barbara, Calif.

(Contract NASw-3542)

(NASA-TM-77088; NAS 1.15:77088; CISE-1795) Avail: NTIS HC A02/MF A01 CSCL 20A

Typical acoustic emission signal characteristics are described and techniques which localize the signal source by processing the acoustic delay data from multiple sensors are discussed. The instrumentation, which includes sensors, amplifiers, pulse counters, a minicomputer and output devices is examined. Applications are reviewed. Author

N84-18017*# College of William and Mary, Newport News, Va.

THE EFFECTS OF BLADE MOUNTED VORTEX GENERATORS ON THE NOISE FROM A MOD-2 WIND TURBINE GENERATOR

Harvey H. Hubbard and Kevin P. Shepherd (Bionetics Corp., Hampton, Va.) Feb. 1984 23 p refs

(Contracts NAS1-16978; NAG1-166)

(NASA-CR-172292; NAS 1.26:172292) Avail: NTIS HC A02/MF A01 CSCL 20A

Comparison noise measurements were made for a standard MOD-2 machine and for one modified to include an array of vortex generators on the suction sides of the blades near maximum thickness. Data were obtained for comparable azimuth angles and distances for a range of wind velocities of 7.6 to 10.3 m/s and for power outputs of 1.4 MW. Since the observed differences are small it is concluded that the inclusion of vortex generators on this machine will result in no significant increase in environmental impact due to noise. Author

N84-18018*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EXPERIMENTAL BLADE VORTEX INTERACTION NOISE CHARACTERISTICS OF A UTILITY HELICOPTER AT 1/4 SCALE

David A. Conner and Danny R. Hoad Jan. 1984 275 p refs Prepared in cooperation with Army Aviation Systems Command (NASA-TM-84653; NAS 1.15:84653; AVSCOM-TR-83-B-1) Avail: NTIS HC A12/MF A01 CSCL 20A

Models of both the advanced main rotor system and the standard or 'baseline' UH-1 main rotor system were tested at one-quarter scale in the Langley 4- by 7-Meter (V/STOL) Tunnel using the general rotor model system. Tests were conducted over a range of descent angles which bracketed the blade-vortex interaction phenomenon for a range of simulated forward speeds. The tunnel was operated in the open-throat configuration with acoustic treatment to improve the semi-anechoic characteristics of the test chamber. Acoustical data obtained for these two rotor systems operating at similar flight conditions are presented without analysis or discussion. A.R.H.

N84-18019# Catholic Univ. of America, Washington, D.C. Human Performance Lab.

AUDITORY INDUCTION OF DISCRETE TONES IN SIGNAL DETECTION TASKS

Kevin B. Bennett, Raja Parasuraman, James H. Howard, Jr., and Alice J. OToole Oct. 1983 41 p

(Contract N00014-79-C-0550; RR0-4209)

(AD-A135502; ONR-TR-83-23) Avail: NTIS HC A03/MF A01 CSCL 20/1

Auditory induction is the apparent continuation of a fainter sound when alternated rapidly with a more intense interrupting sound. In the present study induction of discrete (non-alternating) tones by contextual tones was examined in three experiments using signal detection methods. Listeners were asked to detect pure tone signals of constant, rising, or falling frequency embedded in noise bursts. The noise bursts were preceded and followed by contextual tones that were designed to produce a constant or changing frequency context. Results indicated that auditory induction is a general factor influencing auditory perception and can be demonstrated either for discrete as well as continuous presentation of sounds. While induction of missing sounds can be beneficial, especially in speech perception, auditory induction can also impair perceptual performance, particularly in monitoring nonspeech sounds for faint signals. Finally, auditory-induction effects can be distinguished from peripheral-masking effects, and although a relation between auditory induction and central masking cannot be ruled out, induction and masking appear to be separate, independent factors, one largely central, and other largely peripheral in nature. GRA

N84-18020# Naval Ship Research and Development Center, Bethesda, Md.

NUMERICAL COMPUTATION OF STEADY STATE SCATTERED SOUND EXTERNAL TO SUBMERGED INFINITE CYLINDERS BY COMBINING FINITE ELEMENT AND INTEGRAL EQUATION METHODS

F. M. Henderson Oct. 1983 36 p

(SR0140301)

(AD-A134773; DTNSRDC-83/075) Avail: NTIS HC A03/MF A01 CSCL 20/1

In a previously reported investigation, scattered sound pressures and velocity distributions on the surfaces of submerged infinite cylinders ensonified by steady-state plane waves were calculated. The numerical method used for these calculations was based on a finite element formulation of the coupled fluid-structure interaction problem and implemented using the NASTRAN computer program. In the present investigation, these pressure and velocity data are used as the basis for numerical calculations of

the scattered sound pressures generated in the exterior fields of the cylinders. The method consists of replacing an infinite cylinder by a finite cylinder whose external sound field, in three dimensions, converges to the required two-dimensional (2-D) field as the cylinder length increases. The field pressures are obtained by numerical quadrature of the HELMHOLTZ integral formulation which relates external field pressures to pressures and normal velocities at the structural surface. Calculated 2-D pressure fields, obtained for rigid and elastic cylinders, are in excellent agreement with analytical results. Author (GRA)

N84-18021# Naval Postgraduate School, Monterey, Calif.
LINEAR TIME-VARIANT SPACE-VARIANT FILTERS AND THE WKB APPROXIMATION Interim Report, Oct. 1982 - Oct. 1983
L. J. Ziomek Oct. 1983 99 p
(AD-A134886; NPS62-83-058) Avail: NTIS HC A05/MF A01 CSCL 20/1

Wave propagation in a random, inhomogeneous ocean is treated as transmission through a linear, time-variant, space-variant, random communication channel. A consistent notation (vis-a-vis ad hoc), fundamental input-output relations, and various time-space transformations for both deterministic and random linear, time-variant, space-variant, filters are established. Using the method of separation of variables and the W.K.B. approximation, a time-invariant, space-variant, random transfer function of the ocean volume is derived. The ocean volume is characterized by a random index of refraction which is a function of depth. The index of refraction is decomposed into a deterministic component and a zero mean random component. In addition, two example calculations are made. GRA

N84-18022# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.
ACOUSTIC IMAGING OF VAPOR BUBBLES THROUGH OPTICALLY NON-TRANSPARENT MEDIA
W. F. Kolbe, B. T. Turko, and B. Leskovar Oct. 1983 10 p refs Presented at the Nucl. Sci. Symp., San Francisco, 19-21 Oct. 1983
(Contract DE-AC03-76SF-00098)
(DE84-003961; LBL-15051; CONF-831015-26) Avail: NTIS HC A02/MF A01

A preliminary investigation of the feasibility of acoustic imaging of vapor bubbles through optically nontransparent media is described. Measurements are reported showing the echo signals produced by air filled glass spheres of various sizes positioned in an aqueous medium as well as signals produced by actual vapor bubbles within a water filled steel pipe. In addition, the influence of the metallic wall thickness and material on the amplitude of the echo signals is investigated. Finally several examples are given of the imaging of spherical bubbles within metallic pipes using a simulated array of acoustic transducers mounted circumferentially around the pipe. The measurement procedures and a description of the measuring system are also given. DOE

N84-18023# Brown Univ., Providence, R. I. Dept. of Chemistry.
PHOTOCHEMICAL GENERATION OF THE OPTOACOUSTIC EFFECT Progress Report, 15 Apr. 1983 - 14 Apr. 1984
Gerald J. Diebold Nov. 1983 14 p refs
(Contract DE-AC02-81ER-10860)
(DE84-003712; DOE/ER-10860/T1) Avail: NTIS HC A02/MF A01

The properties of the optoacoustic effect produced by the photodissociation and recombination of chlorine were studied. An acoustic response was observed both from the time-delayed recombination of the fragments and from the prompt signal due to photofragment recoil and change in mole number of the gas. The data were fit to theoretical expressions and found to agree well with published rates and bond energies. In addition, calculations were performed to determine the nature of thermal noise in photoacoustic cells. Finally, a prediction of interference in the fluorescence from molecular photodissociation was made. DOE

N84-18024# Oak Ridge National Lab., Tenn.
TORSIONAL ULTRASONIC TECHNIQUE FOR REACTOR VESSEL LIQUID LEVEL MEASUREMENT
W. B. Dress 1983 13 p refs Presented at the 11th NRC Water Reactor Safety Res. Inform. Meeting, Gaithersburg, Md., 14 Oct. 1983
(Contract W-7405-eng-26)
(DE84-003357; CONF-8310143-63) Avail: NTIS HC A02/MF A01

A detailed study of an ultrasonic waveguide employed as a level, density, and temperature sensor was undertaken. The purpose was to show how such a device might be used in the nuclear power industry to provide reliable level information with a multifunction sensor, thus overcoming several of the errors that led to the accident at Three Mile Island. Some additional work is needed to answer the question raised by the current study, most noticably the damping effects of flowing water. DOE

N84-18025# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
REDUCTION OF PROPELLER NOISE BY A REFLECTING RUBBER LAYER
Rolf Soederqvist and Stig Soederqvist Aug. 1983 23 p refs In SWEDISH; ENGLISH summary
(FOA-C-20506-E4; ISSN-0347-3694) Copyright. Avail: NTIS HC A02/MF A01

The pressure pulses from ship propeller blades were reflected by a soft layer of cellrubber coating applied on the underwater part of the stern. The ship treated was a 5000 ton dwt asphalt tanker. The soft layer works in the near field of the propeller blades, which are assumed to be simple acoustic sources with harmonics. Because of the mechanical nonlinearity of the rubber material, useful reflection is obtained only from the second harmonic and upwards. Measured noise reduction is 15 dB at 100 Hz, 5 dB at 45 Hz, and the damping of motor vibrations is 3.5 dB. The first harmonic, at 20 Hz, increases by 5 dB.
Author (ESA)

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N84-18026*# Howard Univ., Washington, D. C. Dept. of Chemistry.
TWO PHOTON EXCITATION AS A TOOL FOR ATMOSPHERIC AND KINETIC RESEARCH Final Report, 1 Jun. 1982 - 31 Jul. 1983
Joshua B. Halpern 31 Jul. 1983 15 p refs
(Grant NAG5-17)
(NASA-CR-175378; NAS 1.26:175378) Avail: NTIS HC A02/MF A01 CSCL 20H

Progress was made in the following areas: two photon excitation cross section of hydroxyl, marker fringe generation of deep UV and VUV radiation, and CN radiative lifetimes. B.G.

N84-18027# New Mexico Univ., Albuquerque.
VIRTUAL CATHODE OSCILLATIONS Interim Scientific Report, 1 Jul. 1982 - 30 Jun. 1983
E. A. Coutsias 30 Jun. 1983 5 p
(Grant AF-AFOSR-0277-82; AF Proj. 2304)
(AD-A135120; AFOSR-83-0945TR) Avail: NTIS HC A02/MF A01 CSCL 20/7

During this period, the single investigator produced two papers with titles, Effects of Thermal Spread on the Space Charge Limit of an Electron Beam, and The Aging of Nuclei in a Binary Mixture. In progress is a paper dealing with the cascade of bifurcations due to delay effects related to the two stream model for virtual cathode formation in its simplest form. A paper, Kapitza-Dirac Scattering, is being written for publication. This report summarizes progress made under the grant during the specified period.
Author (GRA)

N84-18028# Mission Research Corp., Alexandria, Va.
NUMERICAL SIMULATIONS OF THE NRL COLLECTIVE PARTICLE ACCELERATOR Final Report, 1 Jul. - 31 Dec. 1983
R. J. Barker Nov. 1983 108 p
(Contract N00014-83-C-0519)
(AD-A135533; MRC/WDC-R-073) Avail: NTIS HC A06/MF A01 CSCL 12/1

Two dimensional, electromagnetic, particle-in-cell numerical simulations of the NRL Collective Particle Accelerator (CPA) have been completed using the MAGIC code. Employing parameters which closely approximated the actual experiment, these simulations revealed the spontaneous formation of a virtual cathode which severely limited the net current flowing in the central beam of the device. These results explain experimental observations and indicate possible modifications which might make the CPA operational. Author (GRA)

N84-18029# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
LINEAR INDUCTIVE ACCELERATOR
V. S. Bosamykin, A. I. Gerasimov, and A. I. Pavlovskiy 4 Nov. 1983 6 p Transl. into ENGLISH of Russian Patent no. 2023656 (6 Oct. 1970) p 1-2
(AD-A135547; FTD-ID(RS)T-1182-83) Avail: NTIS HC A02/MF A01 CSCL 20/7

A proposed accelerator, differing from existing ones in that it is loaded through a capacitor on a solenoid which is uniformly distributed throughout the accelerating system and connected to an independent electrical current source, is discussed. The design of the system makes it possible to improve the uniformity of the electrical field and increase the longitudinal focusing magnetic field. This is especially important for high-current accelerators. R.J.F.

N84-18030# Naval Research Lab., Washington, D. C. Beam Dynamics Group.
EXTERNAL INJECTION INTO A HIGH CURRENT MODIFIED BETATRON ACCELERATOR
F. Mako, W. Manheimer, C. A. Kapetanakos, D. Chernin (Berkeley Research Assoc., Springfield, Va.), and F. Sandel (Sachs/Freeman Assoc., Bowie, Md.) 8 Nov. 1983 15 p
(RR01109)
(AD-A134694; NRL-MR-5196) Avail: NTIS HC A02/MF A01 CSCL 20/7

By axially tapering the current density at each end of an axial pinch a scheme is developed for injecting electrons across magnetic field lines into a modified betatron accelerator. This scheme produces only a minimal perturbation to the circulating electron beam. The axial pinch provides beam equilibrium in the transverse field and the tapering reduces the non-adiabatic growth of the perpendicular particle velocity from 0.5 c to .05 c for the parameters of the NRL modified betatron. Author (GRA)

N84-18031# California Univ., Livermore. Lawrence Livermore Lab.
DE-EXCITATION AND EQUIPARTITION IN H2-SURFACE COLLISIONS
A. M. Karo, J. R.. Hiskes, K. D. Olwell, T. M. DeBoni, and R. J. Hardy (Nebraska Univ., Lincoln) Nov. 1983 10 p refs Presented at the 3rd Intern. Symp. on the Production and Neutralization of Negative Ions and Beams, Upton, N.Y., 14-18 Nov. 1983
(Contract W-7405-eng-48)
(DE84-003008; UCRL-89586; CONF-831180-2) Avail: NTIS HC A02/MF A01

Computer molecular dynamics was used to study de-excitation of vibrationally-excited H2 molecules undergoing repeated collisions with a wall maintained at some temperature T(W). The average loss or gain of vibrational, rotational, translational, and total molecular energy was calculated as a function of the number of collisions for a statistically significant number of molecules having some initial vibrational state v double prime ranging from v double prime = 2 to v double prime = 12. For initial translational and rotational temperatures around 500 K, a consistent picture of rapid vibrational de-excitation during the first collision, with a corresponding increase in translational kinetic energy and with rotational excitation from an initial J = 1 state up through values greater than J = 14 was obtained. Wall collisions are found to provide an effective and rapid kinematic mechanism for V-T, V-R, and R-T energy transfer. The rate of loss of total molecular energy to the wall (accommodation) is discussed and compared with the rate of energy redistribution (equipartition) among the vibrational, rotational, and translational degrees of freedom of the molecules. DOE

N84-18032# Maryland Univ., College Park.
BEAM FRONT ACCELERATORS
M. Reiser 1982 19 p refs Presented at the European Comm. of Future Accelerators, the Challenge of Ultra-High Energies Conf., Oxford, 27-30 Sep. 1982
(Contract DE-AS05-78ER-05940)
(DE84-003709; CONF-820980-8) Avail: NTIS HC A02/MF A01

An intense relativistic electron beam cannot propagate in a metal drift tube when the current exceeds the space charge limit. Very high charge density and electric field gradients (10(2) to 10(3) MV/m) develop at the beam front and the electrons are reflected. When a neutral gas or a plasma is present, collective acceleration of positive ions occur, and the resulting charge neutralization enables the beam to propagate. Experimental results, theoretical understanding, and schemes to achieve high ion energies by external control of the beam from velocity will be reviewed. DOE

N84-18033# Texas A&M Univ., College Station. Dept. of Physics.
PROGRESS IN NUMERICAL CALCULATIONS OF ION-ATOM COLLISIONS
J. F. Reading, A. Ford, and R. L. Becker (ORNL, Tenn.) 1983 5 p ref Presented at the US/Japanese Seminar on Phys. of Highly Ionized Ions Produced in Heavy Ion Collisions, Honolulu, 14-18 Mar. 1983
(Contract W-7405-eng-26)
(DE84-003405; CONF-830390-2) Avail: NTIS HC A02/MF A01

An ion-atom collision produces a time dependent perturbation of a many fermion system during which excitation, ionization and charge transfer can occur. The driving mechanism for these processes may be thought of as the potentials seen by individual electrons at any given separation of the projectile and target nuclei. If these potentials are viewed as belonging to the target (a nucleus and electrons) and the projectile (another nucleus and electrons), then as detected by an electron the potentials change because: the target and projectile change position, and electrons on the target and projectile change states. Progress made in the last decade on solving the independent particle model (IPM) is reviewed. How to reduce the IPM to the single electron model and a method where charge transfer is important are discussed. Some standard models with modern calculations are considered. DOE

N84-18034# Brookhaven National Lab., Upton, N. Y.
MEAN FIELD THEORY OF THE LINEAR SIGMA-MODEL: CHIRAL SOLITONS
S. Kahana and G. Ripka (CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette, France) 1983 17 p refs Presented at the Meeting of the Nucl. Phys. Div. of the Am. Phys. Soc., Notre Dame, Ind., 13 Oct. 1983
(Contract DE-AC02-76CH-00016)
(DE84-002864; BNL-33824; CONF-831065-1) Avail: NTIS HC A02/MF A01

The mean field theory of the chiral invariant sigma-model is outlined. Bound states (solitons) of valence quarks are obtained self-consistently using a hedgehog shape for the pion field. A schematic model for the coupled fermion-boson fields is presented. Renormalization is worked out for the fermion one-loop corrections and numerical results presented for the purely scalar-field case. The interpretation of the baryon number of the perturbed vacuum is considered. DOE

N84-18035# Texas A&M Univ., College Station. Dept. of Physics.
LEARNING FROM NUMERICAL CALCULATIONS OF ION-ATOM COLLISIONS
J. F. Reading, A. Ford, J. S. Smith, and R. L. Becker (ORNL) 1983 11 p refs Presented at the 13th Intern. Conf. on the Phys. of Electron. and Atomic Collisions (ICPEAC), Berlin, 27 Jul. 1983
(Contract W-7405-eng-26; Grant NSF PHY-79-09146)
(DE84-003265; CONF-830706-8) Avail: NTIS HC A02/MF A01

An efficient new many body method was developed that has the speed characteristics of the single electron problem yet has the flexibility to be applied to give an approximate solution with almost no effort and an increasingly accurate one with the expenditure of more computer time. In tests against exactly soluble two-body systems of experimental interest it was shown that the simplest approximation called the three stage approximation (TSA) is accurate. B.G.

N84-18036# Argonne National Lab., Ill.
PROPOSED SECOND HARMONIC ACCELERATION SYSTEM FOR THE INTENSE PULSED NEUTRON SOURCE RAPID CYCLING SYNCHROTRON
J. Norem, F. Brandeberry, and A. Rauchas 1983 4 p refs Presented at the Particle Accelerator Conf., Santa Fe, N.Mex., 21 Mar. 1983
(Contract W-31-109-eng-38)
(DE84-003601; CONF-830311-193) Avail: NTIS HC A02/MF A01

The Rapid Cycling Synchrotron (RCS) of the Intense Pulsed Neutron Source (IPNS) operating at Argonne National Laboratory is presently producing intensities of 2 to 2.5 x 10(12) protons per pulse (PPP) with the addition of a new ion source. This intensity is close to the space charge lists of the machine, estimated at approx. 3 x 10(12) ppp, depending somewhat on the available aperture. With the present good performance in mind, accelerator improvements are being directed at: (1) increasing beam intensities for neutron science; (2) lowering acceleration losses to minimize activation; and (3) gaining better control of the beam so that losses are made to occur when and where they are most easily controlled. On the basis of preliminary measurements, a third cavity is proposed for the RF systems which would provide control of the longitudinal bunch shape during the cycle which would permit raising the effective space charge lists of the accelerator and our reducing losses. DOE

N84-18037# Brookhaven National Lab., Upton, N. Y.
LOW ENERGY NEUTRINO PHYSICS
D. Hywel White 1983 18 p refs Presented at the 3rd LAMPF II Workshop, Los Alamos, N. Mex., 18-29 Jul. 1983
(Contract DE-AC02-76CH-00016)
(DE84-002856; BNL-33864; CONF-830798-6) Avail: NTIS HC A02/MF A01

Two reactions (anti nu)/sub (mu)/e yields (anti nu)/sub (mu)/)e and (anti nu)/sub (mu)/p yields (anti nu)/sub (mu)/p are perceived to be of fundamental importance in the understanding of the low energy behavior of the neutral current process. The limit to the accuracy of determination of these low energy parameters is due to statistics in the first case and systematic effects in the second. Increases in neutrino flux is expected in the future both at the AGS in the near future and ultimately at accelerators like LAMPF II. These increases are used to increase the available counts and also to take advantage of increased segmentation of the detectors to improve systematic understanding of the data. The need to match progress on both statistical and systematic fronts is hard to exaggerate, and will require a program of continuous improvement in detector and accelerator quality. DOE

N84-18038# Florida State Univ., Tallahassee. Dept. of Physics.
RESEARCH IN THEORETICAL NUCLEAR PHYSICS Progress Report
D. Robson 1983 10 p refs
(Contract DE-AS05-79ER-10419)
(DE84-003442; DOE/ER-10419/3) Avail: NTIS HC A02/MF A01

Calculable quark dynamical models based on intuitive methods of including the major effects from QCD were examined. Large scale calculations of light nuclei based on a given model were not begun simply because it is necessary to survey first what should be the important ingredients of any model. Each of the thrusts tackled this year, although at first sight appearing to be fragmentary, are actually all possible ingredients to be surveyed as interrelated components of a model to be used in larger scale calculations. In the first year of the present three year contract there were several major thrusts: (1) the relativistic Salpeter equation was solved for various Lorentz-Dirac types of potentials for heavy g anti g systems; (2) the two gluon virtual annihilation mechanism as a source of the (pi degree) eta-eta prime mass differences was investigated using a fully relativistic on the energy shell Feynman graph; (3) comparison of several hadron-hadron interactions using the conventional quark (two body potentials) dynamics up to 2 bar h(omega) was made; and (4) an alternative quark dynamics incorporating orthogonality constraints consistent with local color gauge invariance was formulated. The significance of each of these achievements is outlined. DOE

N84-18039# Virginia Univ., Charlottesville. Dept. of Physics.
NEW HORIZONS IN ELECTROMAGNETIC PHYSICS
J. V. Noble, ed. and R. R. Whitney, ed. 1983 629 p refs Proceedings of Conf. held in Charlottesville, Va., 21-24 Apr. 1982 Sponsored in part by NSF
(Grant DE-FG05-82ER-40058)
(DE84-002600; DOE/ER-40058/1; CONF-820475) Avail: NTIS HC A99/MF A01

The aims of the conference were divided into the following topics: (1) to define the present understanding of nuclear and particle physics at their interface, immediate energy physics, (2) to clarify the issues, that is, to identify the areas where there is uncertainty or disagreement, (3) to propose new experiments which might illuminate the areas which are presently unexplored or fuzzy. Separate abstracts were prepared for the papers presented. B.G.

N84-18040# Argonne National Lab., Ill. Materials Science and Technology Div.
VELOCITY AND ELECTRONIC STATE DISTRIBUTIONS OF SPUTTERED Fe ATOMS BY LASER-INDUCED FLUORESCENCE SPECTROSCOPY
C. E. Young, W. F. Calaway, M. J. Pellin, and D. M. Gruen 1983 21 p refs Presented at the Am. Vacuum Soc. Symp., Boston, 31 Oct. 1983
(Contract W-31-109-eng-38)
(DE84-003649; CONF-831011-4) Avail: NTIS HC A02/MF A01

Velocity distributions and relative populations in the fine structure levels of the a(5)D/sub J/ ground state of Fe atoms, produced by sputtering with a 3 keV argon ions, were investigated by Doppler shifted laser induced fluorescence. The laser system employs a single mode, scanning ring dye laser, amplified by a sequence of three excimer pumped flowing dye cells. Frequency doubling in a KD*P crystal was used to produce high energy (> .5 mJ) pulses of narrowband tunable UV output near 300 nm. Laser power influence on effective velocity bandwidth was investigated. Favorable light collection geometry minimized distortion of the velocity spectra from apparatus averaging effects. In impurity flux diagnostic applications in fusion devices, substantial spatial averaging may occur. In the latter case, the narrow velocity bandwidth (70 m/s, transform limit) of the present laser system is particularly useful. DOE

N84-18041# Argonne National Lab., Ill.
PRELIMINARY TESTS OF A SECOND HARMONIC RF SYSTEM FOR THE INTENSE PULSED NEUTRON SOURCE SYNCHROTRON
J. Norem and F. Brandeberry 1983 5 p refs Presented at the 7th Meeting of the Intern. Collaboration on Advanced Neutron Sources, Ontario, 12 Sep. 1983
(Contract W-31-109-eng-38)
(DE84-003595; CONF-8309156-13) Avail: NTIS

HC A02/MF A01

The rapid cycling synchrotron of the intense pulsed neutron source operating at Argonne National Laboratory is producing intensities of 2 to 2.5 x 10 to the 12th power protons per pulse with the addition of a new ion source. This intensity is close to the space charge limit of the machine, estimated at approx. 3 x 10(12) ppp, depending somewhat on the available aperture. A third cavity is proposed for the RF system which would provide control of the longitudinal bunch shape during the cycle thus permitting the raising of the effective space charge limit of the accelerator and reducing losses by providing more RF voltage at maximum acceleration. The expected benefits are outlined and results obtained during low energy operation with one of the two existing cavities operating at the second harmonic (2f0) are presented. DOE

N84-18042# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.

POWER-AMPLIFICATION OF A HEAVY-ION BEAM IN AN INDUCTION LINAC

A. Faltens and D. Keefe Sep. 1983 7 p ref Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12-14 Sep. 1983

(Contract DE-AC03-76SF-00098)

(DE84-002911; LBL-16639; CONF-830911-36) Avail: NTIS HC A02/MF A01

In contrast to an RF linac - a constant-current device in which the beam power is increased solely by the addition of kinetic energy, gV, - the induction linac (I.I.) can amplify the beam power at a much more rapid rate. Proper programming of the switching of the modules and the shape of their voltage waveforms in the early stages of acceleration, can result in a beam current that rises at a rate between V/sup 1/2/ and V and, consequently, a beam power that varies in the range V/sup 3/2/ to V(2). The current is limited by the transport lens system, which must overcome the beam defocusing force due to space charge. DOE

N84-18043# National Inst. voor Kernfysica en Hoge Energieysica, Amsterdam (Netherlands).

[ACTIVITIES IN NUCLEAR AND HIGH ENERGY PHYSICS] Annual Report, Jul. 1982 - Jun. 1983

1983 101 p refs

Avail: NTIS HC A06/MF A01

Electron scattering; pion, muon and baryon physics; radio and nuclear chemistry; and nuclear and high energy physics technical programs are summarized. Author (ESA)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N84-18044*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

NEON TRANSPORT IN SELECTED ORGANIC COMPOSITES

Lawrence W. Townsend, John W. Wilson, and Hari B. Bidasaria (Old Dominion Univ.) Feb. 1984 19 p refs

(NASA-TM-85693; L-15690; NAS 1.15:85693) Avail: NTIS HC A02/MF A01 CSCL 20H

An energy-dependent, perturbation expansion solution for heavy-ion transport in one dimension was used to calculate the dose from Ne-20 beams at incident kinetic energies of 350, 670, and 2000 MeV/amu onto selected organic composites. Transport coefficients, applicable to arbitrary ion beams over a broad range of energies, are presented. Polyethylene and Kapton were tested as constituents of multilayered shielding for spacecraft and astronauts. A.R.H.

N84-18045# Rockwell International Corp., Canoga Park, Calif. Energy Systems Group.

SP-100 PROGRAM: SPACE REACTOR SYSTEM AND SUBSYSTEM INVESTIGATIONS

R. B. Harty 30 Sep. 1983 59 p refs

(Contract DE-AT03-82SF-11687)

(DE84-003217; ESG-DOE-13414) Avail: NTIS HC A04/MF A01

For a space reactor power system, a comprehensive safety program will be required to assure that no undue risk is present. The nuclear safety review/approval process that is required for a space reactor system is summarized. The documentation requirements are presented along with a summary of the required contents of key documents. Finally, the aerospace safety program conducted for the SNAP-10A reactor system is summarized. The results of this program are presented to show the type of program that is expected and to provide information that could be usable in future programs. DOE

74 OPTICS

Includes light phenomena.

N84-18046*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

EFFECTS OF SYSTEMATIC ERRORS ON THE MIXING RATIOS OF TRACE GASES OBTAINED FROM OCCULATION SPECTRA

W. A. Shaffer, J. H. Shaw, and C. B. Farmer [1983] 35 p refs

(Grant NsG-7469)

(NASA-CR-175371; NAS 1.26:175371) Avail: NTIS HC A03/MF A01 CSCL 20F

The influence of systematic errors in the parameters of the models describing the geometry and the atmosphere on the profiles of trace gases retrieved from simulated solar occultation spectra, collected at satellite altitudes, is investigated. Because of smearing effects and other uncertainties, it may be preferable to calibrate the spectra internally by measuring absorption lines of an atmospheric gas such as CO2 whose vertical distribution is assumed rather than to relay on externally supplied information. Author

N84-18047*# Battelle Columbus Labs., Ohio.

LUNEBURG LENS AND OPTICAL MATRIX ALGEBRA RESEARCH

V. E. Wood, J. R. Busch, C. M. Verber, and H. J. Caulfield 10 Feb. 1984 113 p refs

(Contract NAS1-16652)

(NASA-TM-172276; NAS 1.15:172276) Avail: NTIS HC A06/MF A01 CSCL 20F

Planar, as opposed to channelized, integrated optical circuits (IOCs) were stressed as the basis for computational devices. Both fully-parallel and systolic architectures are considered and the tradeoffs between the two device types are discussed. The Kalman filter approach is a most important computational method for many NASA problems. This approach to deriving a best-fit estimate for the state vector describing a large system leads to matrix sizes which are beyond the predicted capacities of planar IOCs. This problem is overcome by matrix partitioning, and several architectures for accomplishing this are described. The Luneburg lens work has involved development of lens design techniques, design of mask arrangements for producing lenses of desired shape, investigation of optical and chemical properties of arsenic trisulfide films, deposition of lenses both by thermal evaporation and by RF sputtering, optical testing of these lenses, modification of lens properties through ultraviolet irradiation, and comparison of measured lens properties with those expected from ray trace analyses. Author

N84-18048# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.

A TEST STRATEGY FOR HIGH RESOLUTION IMAGE SCANNERS Final Technical Report, 13 Mar. - 15 Sep. 1983

Armin W. Gruen Fort Belvoir, Va. Army Engineer Topographic Labs. Oct. 1983 63 p

(Contract DAAG29-81-D-0100)

(AD-A134998; OSU/DGSS-350; ETL-0345) Avail: NTIS HC A04/MF A01 CSCL 17/8

The scope of this study is the design of a device-independent test strategy for performance tests of the AIDS (Advanced Image Digitizing System) scanner. Major system characteristics to be tested are the geometrical accuracy, linearity of gray shade response, MTF, and resolution of the output. Other parameters addressed here are dynamic range, noise, response uniformity, flare light, coherency, and temporal stability. Test standards are suggested and data processing aspects are considered for both the geometric and radiometric tests. The recommended test strategy is finally summarized in table format. Author (GRA)

N84-18049# Harvard Univ., Cambridge, Mass. Div. of Applied Sciences.

QUANTIFICATION OF INTERFERENCE AND DETECTABILITY PROPERTIES OF VISUAL STIMULI FOR OPTIMAL DISPLAY DESIGN Annual Scientific Report, 1 Apr. 1982 - 31 Mar. 1983

R. Kronauer 19 May 1983 27 p

(Contract F49620-81-K-0016; AF Proj. 2313)

(AD-A135436; AFOSR-83-1015TR) Avail: NTIS HC A03/MF A01 CSCL 20/6

The author's objective is the quantitative characterization of visual spatio-temporal channeling of information. The immediate approach of this study is to measure the detectability of a visual test stimulus which is a moving sinusoidal grating pattern, in the presence of a masking visual stimulus, which can be represented in spatio-temporal frequency space as band-limited two dimensional dynamic visual noise. He has performed coherent masking studies in which the mask is a high-contrast traveling wave grating and have discovered that the masking function is very asymmetrical in spatial frequency when the mask and test gratings are matched in velocity. It was also discovered that band limited two dimensional visual noise can be simulated by discrete (punctate) spectral components lying within the desired band and that as few as six components can give a representation indistinguishable from continuous-spectrum noise. To perform these band-limited visual noise studies the author created a unique computer controlled system for image generation. GRA

N84-18050# Rockwell International Corp., Thousand Oaks, Calif. Science Center.

ADVANCED FILTER TECHNOLOGY Summary Technical Report, 1 Aug. 1982 - 16 Sep. 1983

W. J. Gunning Nov. 1983 26 p

(Contract N00014-82-C-0725)

(AD-A135446; SC5334.2SR) Avail: NTIS HC A03/MF A01 CSCL 20/6

The objective of this program was to develop new concepts for narrowband wide field-of-view filters for submarine laser communications. Initial modeling work was performed on several promising birefringent filter designs and a brief study of the low temperature properties of sheet polarizers was performed. An extension of the concept of the magnetooptic filter has been derived which results in lower magnetic field requirements. Following a redirection of program goals, the assembly of wide field-of-view half waveplates, as required by the cadmium sulfide dispersive birefringent filter for submarine laser communications, was pursued. Author (GRA)

N84-18051# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

CHINESE JOURNAL OF INFRARED RESEARCH (SELECTED ARTICLES)

9 Nov. 1983 94 p Transl. into ENGLISH from Hongwai Yanjiu (China), v. 2, no. 2, 1983 p 89-96, 103-136 and 147-152

(AD-A135504; FTD-ID(RS)T-1441-83) Avail: NTIS HC A05/MF A01 CSCL 20/6

The following topics are discussed: absorption spectra of Hg(0.656)Cd(0.344)Te compared with the Kane Model; performance of the pyroelectric vidicon imaging system; responsivity of pyroelectric detectors; pyroelectric effect of modified PZT ceramics at the F(RL)--F(RH) transition; technological principle of the unequal thickness hot-pressing of infrared optical materials; anodization on the photovoltaic infrared detector surface of InSb; feasibility problems in the application of infrared heating in a wafer furnace; application examples of infrared thermometer in power system; and big potential of infrared technique in energy conservation. Discussion Conference Held at Nanjing. Author

N84-18052# Massachusetts Univ., Amherst. Dept. of Mathematics and Statistics.

A MODEL FOR ORDINAL FILTERING OF DIGITAL IMAGES

M. F. Janowitz Sep. 1983 34 p

(Contract N00014-79-C-0629)

(AD-A134705; TR-J8301) Avail: NTIS HC A03/MF A01 CSCL 20/6

Spatial filtering techniques for monochromatic digital images are examined within the context of an ordinal model that is also suitable for cluster analysis. For techniques based on information received from a 3 by 3 window, those filters are specifically described that yield the highest probability of providing correct classification of pixels. Author (GRA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N84-18053# Overseas Relations Branch Translation Service, London (England).

THE CATHODE MATERIAL FOR A PLASMA-ARC HEATER

A. V. Yelyutin, I. K. Berlin, V. V. Averyanov, V. S. Kadyshevskii, A. A. Savchenko, and R. G. Putintseva 28 Nov. 1983 7 p refs Transl. into ENGLISH from Nauchn. Tr. Gos. Nauch.-Issled. Proektn. Inst. Indkomet Prom-It. Giredmet. (USSR), no. 96, 1980 p 86-90

(BLL-OA-Trans-3126-(6196.3)) Avail: British Library Lending Div., Boston Spa, Engl.

The cathode of a plasma arc heater experiences a large thermal load. The temperature of its working surface, which is in contact with the plasma, reaches high values, as a result of which the electrode material is subject to erosion. Refractory metals are usually employed for the cathode material, but because of the severe erosion do not usually have a long working life. The most important electrophysical characteristic of the electrode is the electron work function. The use of materials with a low electron work function allows a decrease in the heat flow to the cathode, and this leads to an increase in its erosion resistance and working life. The electroerosion of certain materials employed for the cathode in an electric arc plasma generator in the process of reduction smelting of refractory metals was studied. Author

N84-18054# Polytechnic Inst. of New York, Brooklyn. Dept. of Electrical Engineering.

INTERACTION OF ELECTROMAGNETIC FIELDS WITH PLASMA Final Report, 1 Oct. 1978 - 31 Dec. 1982

Bernard R. Cheo, Spencer P. Kuo, and Brian R. Poole Aug. 1983 46 p

(Grants AF-AFOSR-0009-79; AF-AFOSR-0009B-79; AF Proj. 2301)

(AD-A135173; POLY-EE-83-003; AFOSR-83-0879TR) Avail: NTIS HC A03/MF A01 CSCL 20/9

Essentially five topics were studied during this time period; three are essentially experimental investigations, and the other two are theoretical in nature. The five topics include: (1) Propagation of microwaves along a plasma column and harmonic generation of electrostatic ion cyclotron waves, (2) Imploding tube experiment, (3) RF Generated Current in a Magnetized Plasma Using a Slow Wave Structure, (4) Wave-Particle interaction at cyclotron resonances, and (5) Turbulent interaction between waves and charged particles. GRA

N84-18055# California Univ., Los Angeles. Center for Plasma Physics and Fusion Engineering.
FUSION REACTORS: PHYSICS AND TECHNOLOGY Annual Progress Report
R. W. Conn, N. M. Ghoniem, G. C. Pomraning, and T. K. Mau Aug. 1983 109 p refs
(Contracts DE-AT03-80ER-52061; DE-AM03-76SF-00034)
(DE83-017148; DOE/ER-52061/1) Avail: NTIS HC A06/MF A01

Fusion reactors are designed to operate at full power and generally at steady state. Yet experience shows the load variations, licensing constraints, and frequent sub system failures often require a plant to operate at fractions of rated power. The technology problems and design implications of startup and fractional power operation on fusion reactors were assessed. The focus of attention was tandem mirror reactors (TMR) and on the plasma and blanket engineering for startup and fractional power operation. Overall problems of startup, shutdown and staged power operation and their influence on TMR design were discussed. A detailed discussion of the plasma physics associated with TMR startup and various means of achieving staged power operation were examined. The issue of instrumentation and safety controls for fusion reactors was covered. The limits on transient power variations during startup and shutdown of Li17Pb83 cooled blankets were discussed. DOE

N84-18056# California Univ., Los Angeles.
RESEARCH ON MODELING OF FED/INTOR RADIO-FREQUENCY HEATING AND STUDIES OF FED/INTOR IMPURITY-CONTROL MECHANISMS Final Technical Report
Robert W. Conn 1983 13 p ref
(Contracts DE-AT03-82ER-54010; DE-AM03-76SF-00034)
(DE83-016756; DOE/ER-54010/T1) Avail: NTIS HC A02/MF A01

A one dimensional model describing the species and spatial power deposition profiles for the fast wave second harmonic heating scheme in a Tokamak was developed. In this model, the plasma is divided along the midpiane into vertical slabs, in each of which the plasma parameters and the magnetostatic field are assumed to be uniform. Using the full kinetic treatment, the local dispersion relation for the fast and ion Bernstein modes is solved, and the wave field is written as a sum of the individual mode components. Limiter design evolution has converged to a rigidly mounted, large area, slotted flat plate toroidal limiter. Efficient particle removal is achieved by locating the neutralization site remotely from the plane of slots. The plasma flows behind the limiter and, using an inclined deflector/neutralizer plate is ballistically scattered toward an off center pump duct. In view of the relatively long He mfp, use of a deflecting plate eases the problems arising from excessive de-enrichment at the pump. DOE

N84-18057# California Univ., Livermore. Lawrence Livermore Lab.
COMPARISONS OF HYDRODYNAMIC BEAM MODELS WITH KINETIC TREATMENTS
J. K. Boyd, J. W. Mark, W. M. Sharp, and S. S. Yu 6 Oct. 1983 14 p refs Presented at the 5th Intern. Conf. on High Power Particle Beams, San Francisco, 12-14 Sep. 1983
(Contract W-7405-eng-48; ARPA Order 4395)
(DE84-003242; UCRL-89471; CONF-830911-35) Avail: NTIS HC A02/MF A01

Hydrodynamic models were derived to describe energetic self-pinched beams, such as those used in ion-beam fusion. The closure of the Mark-Yu model is obtained with adiabatic assumptions mathematically analogous to those of Chew, Goldberger, and Low for MHD. The other models treated here use an ideal gas closure and a closure by Newcomb based on an expansion in V/sub th//V/sub z/. Features of these hydrodynamic beam models are compared with a kinetic treatment. DOE

N84-18058# Los Alamos Scientific Lab., N. Mex.
PRECISELY ALIGNED INTERNAL MAGNETIC PROBES FOR THE REVERSED-FIELD PINCH EXPERIMENT, ZT-40
L. C. Burkhardt Oct. 1983 15 p refs
(Contract W-7405-eng-36)
(DE84-003704; LA-9613-MS) Avail: NTIS HC A02/MF A01

A 10 station, 20 coil internal magnetic sensing probe for diagnosing the ZT-40 plasma is described. The coils are precisely aligned for coplanarity and orthogonality to within a fraction of a degree, have a sensitivity of approx. 2.5 cm(2)t, and are flat to above 2.5 MHz. DOE

N84-18059# Los Alamos Scientific Lab., N. Mex.
FOURIER TRANSFORM AND POLYCHROMATOR STUDIES OF THE INDUCTIVELY COUPLED PLASMA Thesis
Lynda Margaret Harris Faires Oct. 1983 424 p refs
(Contract W-7405-eng-36)
(DE84-003975; LA-9888-T) Avail: NTIS HC A18/MF A01

Analytical and spectrophysical properties of the inductively coupled argon plasma (ICP) excitation source for analytical atomic spectroscopy were investigated using both a wavelength dispersive dual-grating polychromator spectrometer and a high resolution Fourier Transform spectrometer. Polychromator studies included documentation of intra-alkali matrix effects and a comparison of top-down and side-on optical design for viewing of the ICP. Fourier Transform studies included the determination of a vertical profile of excitation temperatures in the plasma by the spectroscopic slope method as well as determination of excitation temperatures for several other elements in the normal analytical zone of the plasma, the measurement of line widths of several hundred spectral lines, an assessment of the analytical applicability and advantages of the ICP-FTS, the identification of 500 iron lines and an extension of the ICP into the near infrared spectral region to 1.7 microns. Preliminary results are given of an optical design using a fiber optic cable. DOE

N84-18060# California Univ., Livermore. Lawrence Livermore Lab.
THRESHOLDS OF RAMAN BACKSCATTER: EFFECTS OF COLLISIONS AND LANDAU DAMPING
Kent Estabrook and W. L. Kruer 3 Nov. 1983 17 p refs Presented at the Meeting of the Plasma Phys. Div. of the Am. Phys. Soc., Los Angeles, 7 Nov. 1983 Submitted for publication
(Contract W-7405-eng-48)
(DE84-003736; UCRL-89448; CONF-831105-4) Avail: NTIS HC A02/MF A01

A 1.5 dimensional simulations and theory of the threshold of Raman backscatter for a variety of density profiles, background temperatures and collision frequencies, nu/sub ei/ are presented. The simulations show Raman backscatter of approx. 4 x 10(+4) at intensities approx. 30 times below the delta n which is due to light scattering off of noise electron plasma waves. The absorption drops significantly and the threshold rises as the Landau damping omega/sub i/ and/or nu/sub ei/ approach the growth rate gamma 0. Many experiments are already in the collisional regime. DOE

N84-18061# Sandia Labs., Albuquerque, N. Mex.
LIGHT ION FUSION
J. Pace VanDevender 1983 6 p refs Presented at the 10th Symp. on Fusion Eng., Philadelphia, 5 Dec. 1983
(Contract DE-AC04-76DP-00789)
(DE84-003767; SAND-83-1621C; CONF-831203-26) Avail: NTIS HC A02/MF A01

The Inertial Confinement Fusion Program with Ligh Ion Drivers is developing high intensity ion beam driver technology on PBFA I and will apply that technology to study implosion hydrodynamics of small fuel masses on PBFA II. Power concentration is the key issue. The research on beam production and focusing is interpreted to give guidelines for future research in the ICF Program. Recent progress is reviewed briefly and the impact of recently discovered problems of ion impurities and beam energy spread are discussed. The lithium ion option for PBFA II was chosen and the first PBFA II diode will be the Applied-B diode. DOE

N84-18062# California Univ., Livermore. Lawrence Livermore Lab.
CIRCULAR WAVEGUIDE SYSTEMS FOR ELECTRON-CYCLOTRON-RESONANT HEATING OF THE TANDEM MIRROR

EXPERIMENT-UPGRADE
B. Felker, M. O. Calderon, A. K. Chargin, F. E. Coffield, N. C. Gallagher, Jr., D. D. Lang, L. R. Pedrotti, R. R. Rubert, B. W. Stallard, and D. W. Sweeney 18 Nov. 1983 6 p refs Presented at the 10th Symp. on Fusion Eng., Philadelphia, 5-9 Dec. 1983
(Contract W-7405-eng-48)
(DE84-003739; UCRL-89235; CONF-831203-21) Avail: NTIS HC A02/MF A01

The rectangular waveguide components were replaced with circular components because of the greater transmission efficiency and power-handling capability of the circular ones. Design, fabrication, and testing of all components were completed for all systems. The system design criteria are described. DOE

N84-18063# California Univ., Livermore. Lawrence Livermore Lab.
INSULATOR MATERIALS IN HIGH POWER LASERS FOR INERTIAL FUSION: PRESENT AND FUTURE
William F. Krupke 11 Nov. 1983 24 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 14-17 Nov. 1983
(Contract W-7405-eng-48)
(DE84-003738; UCRL-89439; CONF-831174-28) Avail: NTIS HC A02/MF A01

The important characteristics of currently used insulator materials. Figures of merit for materials needed in future systems are identified. A methodology for identifying and evaluating new materials meeting the stringent performance requirements of future fusion laser systems is outlined. DOE

N84-17224*# General Dynamics Corp., San Diego, Calif.
PHOTOVOLTAIC CONCENTRATOR POINTING DYNAMICS AND PLASMA INTERACTION STUDY
Theodore G. Stern *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 177-184 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 20I

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N84-18064# British Library Lending Div., Boston Spa (England).
OPTIMUM DIMENSIONS OF SOLID ZIRCONIUM DIOXIDE-BASE ELECTROLYTE IN TRANSDUCER OF ACTIVITY METER
O. K. Tokovoi, L. S. Alekseenko, A. A. Epov, and A. P. Fedulov [1983] 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chern. Met. (USSR), no. 4, 1983 p 1-4
Avail: British Library Lending Div., Boston Spa, Engl.

Tests were conducted in a laboratory resistance furnace at 1600 C to study the polarization of chromium-chromium oxide and molybdenum-molybdenum oxide reference electrodes in contact with a solid electrolyte of zirconium dioxide stabilized with 12% (mol.) of calcium oxide. The optimum dimensions of the zirconium dioxide base electrolyte were determined, as well as the range of applicability of the given reference electrodes in the measurement of oxygen activity in liquid iron. Author

N84-18065 Brown Univ., Providence, R. I.
ELEMENTARY EXCITATIONS IN SEMICONDUCTOR SUPERLATTICES STRUCTURES Ph.D. Thesis
Alexandros Constantine Tselis 1983 132 p
Avail: Univ. Microfilms Order No. DA8326048

Two types of semiconductor superlattices were studied. In type I superlattices, modulation doping is used to obtain free electrons in the A layers. In type II superlattices, the band matchup between the A and B layers is such that the conduction band minimum of A is below the valence band maximum of B, so that electrons are transferred from the B layers to the A layers, leaving holes behind in the B layers. The electronic collective modes of both types were studies. A simple linear response formalism was used to obtain their self-sustaining oscillations which yield the dispersion relations of the excitations. Effects of depolarization and excitonic shifts, magnetic fields and electron-phonon coupling are explained. A rich spectrum of collective modes was found: quasi-2d plasmons, intersubband modes, quasi-25 magnetoplasmons, phonon-quasi-2D magnetoplasmons, helicons, alfven waves and helicon-plasmons. Dissert. Abstr.

N84-18066*# Stanford Univ., Calif. Dept. of Applied Physics.
GROWTH AND EVALUATION OF AgGaS2 AND AgGaSe2 FOR INFRARED NONLINEAR APPLICATIONS Semiannual Progress Report, Aug. 1982 - Feb. 1983
Robert L. Byer and Robert S. Feigelson Oct. 1983 13 p
(Grant NAG5-220)
(NASA-CR-175185; NAS 1.26:175185) Avail: NTIS HC A02/MF A01 CSCL 20L

The crystal growth technology for the two chalcopyrite compounds AgGaS2 and AgGaSe2 was studied. These two materials demonstrated their promise as important nonlinear crystals for infrared applications ten years ago. However, at the time, a number of various growth related problems such as cracking, twinning and the occurrence of optical scattering centers made it difficult to obtain high quality specimens in sizes exceeding 1 cm. Using seeding and precision-tapered fused quartz growth ampoules, a Bridgman/Stockbarger growth technology was developed to grow crack and twin-free boules in increasingly larger dimensions with an ultimate goal of 4 cm crystals harvested obliquely from c-axis boules. The post-growth heat treatment procedures were studied to understand the solid state chemical reactions and to avoid crystal damage which frequently occurs during these annealing procedures. Author

N84-18067*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
MUON SPIN ROTATION IN SOLIDS Final Annual Report, Feb. 1983 - Feb. 1984
Carey E. Stronach [1983] 23 p refs
(Grant NsG-1342)
(NASA-CR-172789; NAS 1.26:172789) Avail: NTIS HC A02/MF A01 CSCL 20L

The muon spin rotation (MuSR) technique is used to probe the microscopic electron density in materials. High temperature MuSR and magnetization measurements in nickel are in progress to allow an unambiguous determination of the muon impurity interaction and the impurity induced change in local spin density. The first results on uniaxial stress induced frequency shifts in an Fe single crystal are also reported. Author

N84-18068# Stanford Univ., Calif.
FILM SYNTHESIS AND NEW SUPERCONDUCTORS Final Technical Report, 1 Oct. 1977 - 15 May 1983
T. H. Geballe May 1983 42 p
(Contract F49620-78-C-0009; AF Proj. 2506)
(AD-A135102; SU-GL-3566; AFOSR-83-0907TR) Avail: NTIS HC A03/MF A01 CSCL 20/3

This research has been concerned with films that are metastable compounds or multilayered composites which are quenched from the vapor phase. They have been stabilized by a number of methods which aid in the quench or by growing upon especially prepared surfaces upon which epitaxial growth can take place. The occurrence of superconductivity in the metastable films has been investigated. Newly developed methods of heat capacity and tunneling techniques have been used to study the superconducting interactions and to provide the increased understanding of the mechanisms of superconductivity necessary to reach higher transition temperatures. GRA

N84-18069# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
InGaPAs BY METALORGANIC CHEMICAL VAPOR DEPOSITION Final Report, 12 May 1980 - 11 May 1983
K. Hess and D. Kasemset Oct. 1983 151 p
(Contract DAAG29-80-C-0125)

(AD-A135281; MRDC41067.6FR; ARO-16836.1-EL) Avail: NTIS HC A08/MF A01 CSCL 20/12

The reaction chemistry involved in the material synthesis of the quaternary compound GaI-xInxAsyPI-y by LPMOCVD has been studied with particular emphasis being devoted to understanding the stoichiometry required to grow these materials lattice matched to InP substrates. A complete characterization of the growth conditions to achieve lattice matched GaInAsP/InP heterostructures was completed during this program. The epitaxial layers were studied by X-ray diffraction and photoluminescence characterization techniques to determine the composition for exact lattice match and the conditions for the appropriate bandgap energy. Optimization of the growth conditions for a particular composition was being performed at the end of the program by monitoring the surface morphology and photoluminescence intensity at various compositions. Electrical transport measurements of mobility and carrier concentration helped to determine the background impurity levels and their dependence on growth conditions. GRA

N84-18070# North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Electrical Engineering.
THERMAL CONDUCTIVITY OF TERNARY AND QUATERNARY III-V COMPOUNDS Final Report, 8 Mar. 1980 - 30 Sep. 1983
W. J. Collis and E. K. Stefanakos 31 Oct. 1983 17 p
(Contract DAAG29-80-C-0088)
(AD-A135336; ARO-16936.1-EL; FR-1) Avail: NTIS HC A02/MF A01 CSCL 20/12

This research project was directed at investigating methods of measuring the thermal conductivity of semiconducting alloys of III-V compounds (GaAlAs, GaInAs.GaInAsP) in a thin layer format. Generally, techniques for measuring the thermal properties of bulk materials are not suited for the thin epitaxial layers which are utilized in active devices. The thermal conductivity is an important design parameter for those devices which must dissipate large amounts of power during operation. The proposed measurement technique utilized a conducting epitaxial alloy layer deposited upon a semi-insulating lattice-matched semiconductor substrate. The thin films were prepared by liquid phase epitaxy or current controlled liquid phase epitaxy. In the initial approach, a filamentary sample with ohmic contacts on the epitaxial layer was fabricated. A constant current was passed through this resistor and the resistance change caused by the Joule heating was monitored. This temperature-related change can, in principle, be related to the thermal properties of the epilayer and substrate. However, because the thermal conductivity of the alloy epilayer is somewhat less than that of the substrate and the epilayer/substrate thickness ratio is quite small, reasonable results could not be obtained. GRA

N84-18071# Illinois Univ., Urbana. Coordinated Science Lab.
HIGH FIELD TRANSPORT OF FREE CARRIERS AT THE Si-SiO2 INTERFACE Final Progress Report, 16 Sep. 1980 - 15 Sep. 1983
K. Hess 27 Oct. 1983 27 p
(Contract DAAG29-80-K-0069)
(AD-A135338; ARO-17687.15-EL-A; FPR-6) Avail: NTIS HC A03/MF A01 CSCL 20/12

Investigations of interface transport, ballistic transport and generally speaking high field transport in silicon and III-V compounds are reported. GRA

N84-18072# Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
ELECTRON BALLISTIC EFFECTS IN III-V SEMICONDUCTORS Final Report, 25 Sep. 1980 - 24 Sep. 1983
G. Y. Robinson and M. Shur Nov. 1983 9 p
(Contract DAAG29-80-K-0087)
(AD-A135353; ARO-17683.16-EL) Avail: NTIS HC A02/MF A01 CSCL 20/12

The purpose of this three-year research program was to study electron transport in III-V semiconductors, starting with an investigation of ballistic transport in GaAs. Also for experimental studies of electron transport in the III-V semiconductors, test devices were to be constructed from submicron layers grown by molecular beam epitaxy. For ballistic electron transport in submicron GaAs devices, the influence of the boundary conditions were explained, a theory for low-field diode conductance was developed, the high-field diode impedance was calculated, and experimental data was compared to theoretical predictions. This work led to an investigation, both experimental and theoretical, of electron transport in the two-dimensional electron gas (TEG) of a modulation-doped heterostructure. The theoretical studies produced a model of electron transport in GaAs/AlGaAs modulation-doped structures and prediction of the electron mobility in TEG layers. The experimental work led to a new method of III-V heterojunction characterization and to an explanation of the temperature dependent behavior of a modulation-doped transistor. GRA

N84-18073# Indiana Univ., Bloomington.
SPECTROSCOPY OF THERMAL ENERGY TRANSPORT Final Report, 17 Mar. 1980 - 15 Sep. 1983
W. E. Bron Oct. 1983 8 p
(Contract DAAG29-80-C-0085)
(AD-A134670; ARO-16869.7-PH) Avail: NTIS HC A02/MF A01 CSCL 20/12

The following research areas were undertaken in this report: Phonon Transport in the Presence of Quasidiffusion; Generation of Coherent THz Phonons through Piezoelectric Surface Excitation; Phonon Lifetimes in the Picosecond Time Domain; and Phonon Transport Across Solid-Solid Interfaces. GRA

N84-18074# Sperry Rand Research Center, Sudbury, Mass.
S-I-S mm-WAVE MIXERS AND DETECTORS Final Report
D. W. Jillie, H. Kroger, L. N. Smith, and D. M. Shaw Oct. 1983 38 p
(Contract N00014-81-C-2525)
(AD-A134762; SRC-CR-83-33) Avail: NTIS HC A03/MF A01 CSCL 20/3

This program is an effort to achieve the ultimate goal of fabricating refractory superconducting S-I-S mixer devices for operation in mm-wave receivers in the quantum mode and in the 8-10 K temperature range. The following progress has been made toward the above goal: (1) development of in-house capability of depositing niobium carbonitride films (Nb (x) N(y) of device quality with transition temperatures to approx. 16 K; (2) development of NbC(x)N(y):aSi:Nb and NbC(x)N(y):Ge:Nb devices of very high quality; (3) fabrication and successful operation of niobium based S-I-S mixer chips; and (4) fabrication and evaluation of aSi and Ge barrier all-NbC(x)N(y) devices. NbC(x)N(y):Ge:Nb devices have been fabricated with chemical vapor deposited (CVD) polycrystalline arsenic-doped germanium barriers. All-Nb-S-I-S mixer chips were fabricated and sent to Goddard Institute for Space Studies to be evaluated. The noise temperature was approx. 60 K and the conversion loss of 5 dB. These results are comparable to Pb alloy junction results. A second-generation mixer was designed by GISS. GRA

N84-18075# Sandia Labs., Albuquerque, N. Mex.
METALLIC MICROWAVE CONDUCTIVITY IN SHOCK-LOADED RUTILE
E. L. Venturini and R. A. Graham 1983 8 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 13-17 Nov. 1983
(Contract DE-AC04-76DP-00789)
(DE84-002174; SAND-83-1422C; CONF-831174-15) Avail: NTIS HC A02/MF A01

Electron spin resonance (ESR) was used to characterize the paramagnetic defects present in both single crystal and powder rutile (TiO2) subjected to explosive shock loading and preserved for post-shock study. The Ti(+3) defect concentration produced by the shock process is an order of magnitude larger than values reported for vacuum-reduced rutile. The ESR lineshape is characteristic of a conducting material, and the estimated microwave resistivity in the shock-loaded powder is more than an order of magnitude lower than the minimum dc value measured in vacuum-reduced rutile. It appears that shock-wave loading leaves the rutile in a defect state not achieved in prior work. DOE

N84-18076# Missouri Univ., Rolla. Dept. of Ceramic Engineering.
CHARACTERIZATION OF HIGH TEMPERATURE ELECTRICALLY CONDUCTING OXIDES
Harlan U. Anderson and Don M. Sparlin Nov. 1983 14 p
(Contract DE-AC02-80ER-10598)
(DE84-002887; DOE/ER-10598/4) Avail: NTIS HC A02/MF A01

Goal was to study the relations between electrical conductivity, oxidation-reduction kinetics, defect structure, and composition of n- and p-type binary and ternary transition metal oxides. Thermogravimetric measurements, X-ray diffraction, transmission electron microscopy, electrical conductivity, electron paramagnetic resonance, and Seebeck measurements were conducted. The oxide systems studied were La-doped SrTiO3, La-doped BaTiO3, and Nb- and Ta-doped TiO2. The electrical conductivity, carrier mobility, and defect concentration for several of the systems are discussed. The most important results were obtained for the SrTiO3 and LaCrO3 systems for which the oxygen activity and temperature stability ranges of the electrical conductivity are defined. It was also learned that the electron mobility in SrTiO3 is not constant with carrier concentration. DOE

N84-18077# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
USING THE SURFACE TENSION TO ESTIMATE THE CONDENSATE DENSITY OF SUPERFLUID He-4
L. J. Campbell 1983 17 p refs Presented at the Symp. on Quantum Fluids and Solids, Sanibel Island, Fla., 11-15 Apr. 1983
(Contract W-7405-eng-36)
(DE83-011325; LA-UR-83-1070; CONF-830456-2) Avail: NTIS HC A02/MF A01

Distortion of the condensate wavefunction at the free surface of superfluid He (4) contributes to the surface tension in proportion to the condensate fraction n(sub 0)(T). Using this to resolve the present discrepancy between the measured and predicted temperature dependencies of the surface tension gives n(sub) (T) in good agreement with results from neutron and X ray scattering measurements. This picture is also consistent with the measured He(3)-He(4) interfacial tension. DOE

N84-18078# Argonne National Lab., Ill. Materials, Science and Technology Div.
CRYSTAL FIELDS AND SECOND ORDER MAGNETIC HYPERFINE INTERACTIONS IN TmFe2Si2
A. M. Umarji, G. K. Shenoy, D. R. Noakes, and S. Dattagupta (Hyderbad Univ., India) Sep. 1983 11 p refs Presented at the 29th Ann. Magnetism and Magnetic Mater. Conf., Pittsburgh, 8-11 Nov. 1983
(Contract W-31-109-eng-38)
(DE84-003622; CONF-831187-13) Avail: NTIS HC A02/MF A01

The measurement of Moessbauer hyperfine spectra of TmFe2Si2 using the 8.4 keV transition in Tm (169) was reported. The detailed temperature dependence of the quadrupole interaction has permitted us to evaluate the crystalline electric fields (CEF) acting on Tm atoms. The analysis indicates the ground state of Tm to be a singlet state. However, the hyperfine coupling of the Tm (169) with the excited CEF states generates a second order magnetic hyperfine interaction which was observed in the experiment. An account of the spin relaxation of the second order magnetic hyperfine interaction is presented. DOE

N84-18079# California Univ., Berkeley. Lawrence Berkeley Lab.
FAST DIFFUSION OF IRON IN SINGLE CRYSTAL RUTILE AND IRON DOPED RUTILE
J. Sasaki, N. L. Peterson (ANL), and L. C. DeJonghe 1983 8 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 14-17 Nov. 1983
(Contract W-31-109-eng-38)
(DE84-004021; CONF-831174-47) Avail: NTIS HC A02/MF A01

Tracer diffusion coefficients of Fe, D/sub Fe/, in a single crystal of rutile and of 0 to 2.0% Fe doped rutile were measured. The oxygen pressure dependence of D/sub Fe/ in pure rutile showed complicated behavior. The values of D/sub Fe/ may consist of contributions from Fe(2+) ions diffusing by an interstitial mechanism and from Fe(3+) ions diffusing by an interstitialcy mechanism in cooperation with tetravalent titanium interstitial ions, Ti/sub i/. The value of D/sub Fe/ in Fe doped rutile attains a saturation value when the Fe content reaches about 0.1%. D/sub Fe/ decreases drastically when the Fe content exceeds about 0.35%. Complex impedance measurements of electrical conductivity indicate the existence of ionic conduction for Fe doped rutile containing less than 0.35% of Fe. The small ionic conductivity relation to the values of D/sub Fe/ suggests that only a small fraction of the iron ions are highly mobile. Above 0.35% Fe, the observed drastic decrease in D/sub Fe/ may result from the formation of a shear structure in highly doped rutile. DOE

N84-18080# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
ANGLE-RESOLVED PHOTOEMISSION EXTENDED FINE STRUCTURE
J. J. Barton, C. C. Bahr, Z. Hussain, S. W. Robey, L. E. Klebanoff, and D. A. Shirley Sep. 1983 9 p refs Presented at the Advances in Soft X-ray Sci. and Technol. Conf., Upton, N.Y., 17-20 Oct. 1983 Sponsored in part by NSF
(Contract DE-AC03-76SF-00098)
(DE84-002899; LBL-16298; CONF-8310172-8) Avail: NTIS HC A02/MF A01

Core level angle resolved photoemission intensity oscillates sinusoidally with increasing photoelectron momentum. Interference between direct and scattered photoemission causes this angle resolved photoemission extended fine structure (ARPFFS). An analytic single scattering theory which quantitatively describes the oscillations is discussed. The procedures for extracting surface geometry information from photoemission measurements will be illustrated with S(1s) ARPEFS from S on Ni(100) and Cu(100) obtained with the soft X-ray double crystal monochromator at the Stanford Synchrotron Radiation Laboratory. Building on the surface sensitivity and chemical selectivity of photoemission, ARPEFS analysis provides direct geometrical information from the oscillation frequencies (derived with auto-regressive Fourier analysis), from intensity changes with polarization and analyzer position, and from analysis of scattering phase shift zero crossings. DOE

N84-18081# Argonne National Lab., Ill. Materials Science and Technology Div.
DIFFUSION MECHANISMS IN TRANSITION-METAL OXIDES
N. L. Peterson 1983 12 p refs Presented at the Mater. Res. Soc. Ann. Meeting, Boston, 14 Nov. 1983
(Contract W-31-109-eng-38)
(DE84-003460; CONF-831174-39) Avail: NTIS HC A02/MF A01

Results are presented for cation self-diffusion in Cu2O and Cr2O3 as a function of temperature and deviation from stoichiometry. A defect model for Cu2O involving neutral and singly charged copper vacancies, electron holes, and singly charged oxygen-interstitial ions is developed and fit to the tracer-diffusion data, the electrical-conductivity data, and the stoichiometry data, yielding concentrations and mobilities of these defects. The diffusion results for Cr2O3 single crystal indicate that cation self-diffusion takes place by triply charged vacancies and that previous diffusion results for polycrystalline Cr2O3 are dominated by grain-boundary diffusion. DOE

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N84-18082 Saint Louis Univ., Mo.
CONTRIBUTIONS TO THE THEORY OF QUANTUM 1/f NOISE Ph.D. Thesis

Taher Sadeg Sherif 1982 81 p
Avail: Univ. Microfilms Order No. DA8325431

The technical terms of noise and some other types of noise are reviewed in brief. The spectral density of 1/f noise is calculated by using the quantum theory of 1/f noise for a scattered beam of charged particles. The characteristic functional is found for the quantum 1/f noise. This characteristic functional shows that quantum 1/f noise is a Gaussian process in first approximation. The logarithmic divergence of the total power-spectrum density of the quantum 1/f noise is resolved by taking radiative corrections of the scattering process into account through the Feynman diagram method. A derivation of the starting points of quantum 1/f noise theory from first principles is given by direct calculation through the Green's function technique of the outgoing wave of a scattering experiment which involves particles coupled to infra-quanta. The result of the calculation is a stochastic outgoing Schrodinger field with random phases reflecting the random initial phases of the electromagnetic field oscillators, or of the infra-quanta modes in general. Dissert. Abstr.

N84-18083 Stevens Inst. of Tech., Hoboken, N. J.
A STUDY OF WAVES ON A CURVED SPACE-TIME Ph.D. Thesis
William J. Heyl 1982 171 p
Avail: Univ. Microfilms Order No. DA8323090

A retarded Green's function is constructed for the case of a scalar wave equation in a model curved space-time and is used to find the solution to the equation for the case of a pure frequency source; this solution is demonstrated to be unique and causal. The solution is then given an asymptotic expansion in a weak field parameter and compared with an approximate solution derived from a singular perturbation technique developed by Anderson and Kegeles, the object being to demonstrate that such perturbation solutions are asymptotic to exact ones which are unique and causal. The approximate solution is shown to be causal itself by comparing the Anderson-Kegeles solution with that obtained by applying the Bardeen-Press technique to the model problem. A slow motion expansion is also performed on the solution and shown to contain terms which reflect the causality of the exact solution.
Dissert. Abstr.

N84-18084# California Univ., Livermore. Lawrence Livermore Lab.
MAXIMUM ENTROPY RECONSTRUCTION OF A VOLUME ANOMALY FROM PULSE SCATTER DATA
R. M. Bevensee Oct. 1983 10 p refs Presented at the Conf. on Quantitative NDE, Santa Cruz, Calif., 7-12 Aug. 1983
(Contract W-7405-eng-48)
(DE84-002463; UCRL-89298; CONF-830811-18) Avail: NTIS HC A02/MF A01

The Boltzmann (non-Burg) Maximum Entropy method is applied to the problem of interferring the shapes of extremely underdetermined volume anomalies from scattered waves on the incident (plane) wave side of the volume probed. The relevance of the entropy concept for this problem is shown. The efficacy of two versions of the method (radiating source and ray path) is indicated by two dimensional synthetic-data problems involving only scalar wave displacement and no shear/compressional wave mixing.
DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N84-18085# Committee on Science and Technology (U. S. House).
A 1983 SCIENCE AND TECHNOLOGY POSTURE HEARING WITH DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY
Washington GPO 1983 62 p Hearing before the Comm. on Sci. and Technol., 98th Congr., 1st Sess., No. 31, 3 Feb. 1983
(GPO-21-095) Avail: Committee on Science and Technology

Three criteria embodied the proposed programs. First, any evaluation of the state of American science and technology reveals fields of research ripe for profound intellectual advances. Second, society derives two tangible benefits from R&D. One is the transfer of knowledge from the lab to society in the form of technological innovations that result in new industries, and new jobs. The third criterion is the appropriateness of the role of the Federal Government in Research and Development. Author

N84-18086*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
A COOPERATIVE PROGRAM TO STIMULATE STUDENT INVOLVEMENT THROUGH THE MIT UNDERGRADUATE RESEARCH OPPORTUNITY PROGRAM Final Report, 1 Sep. 1982 - 31 Aug. 1983
Jan. 1984 92 p refs
(Grant NsG-1206)
(NASA-CR-173300; NAS 1.26:173300) Avail: NTIS HC A05/MF A01 CSCL 05I

Flow characteristics in the low speed Wright Brothers Wind Tunnel were studied. Calculations to check the precision of the tunnel were conducted. A program for generating computational grids around an airfoil was developed and compared with the wind tunnel model. Low Reynolds number flow phenomenon of periodic vortex shedding in a wake were also studied by applying a hot-wire anomemeter. For individual titles, see N84-18087 through N84-18090.

N84-18087*# Massachusetts Inst. of Tech., Cambridge.
HOT WIRE IN LOW REYNOLDS NUMBER FLOW Prgress Report
Mark A. Kolb and Eugene E. Covert *In its* A Coop. Program to Stimulate Student Involvement through the MIT Undergraduate Research Opportunity Program Jan. 1984 16 p (For primary document see N84-18086 08-80)
Avail: NTIS HC A05/MF A01 CSCL 05I

Progress reports were issued on the following experiments: (1) low Reynolds number flow phenomenon of periodic vortex shedding in the wake behind a cylinder as studied by applying the hot wire anemometer technique of flow measurement. The downstream diffusion of these shed vortices was of prime concern. An evaluation of the performance of the hot wire at low Reynolds number is also considered. (2) A brief examination of the back sections of the Wright Brothers wind tunnel circuits were conducted to establish whether or not gross flow deviations were present at corners, or turning vane regions. A calibration of the test sections was done. (3) The attractiveness of using rembedded grids for airfoil calculations modeled by the Euler equations was explored. These calculations were extended to C-type grids and then to Navier-Stokes calculations, B.G.

N84-18088*# Massachusetts Inst. of Tech., Cambridge.
FLOW BEHAVIOR IN THE WRIGHT BROTHERS FACILITY Final Report c09
Stephen Genn *In its* A Coop. Program to Stimulate Student Involvement through the MIT Undergraduate Research Opportunity Program Jan. 1984 42 p (For primary document see N84-18086 08-80)
(WBWT-TR-1187) Avail: NTIS HC A05/MF A01 CSCL 01A

It has become increasingly apparent that a reexamination of the flow characteristics in the low speed Wright Brothers Facility (WBF) is of some importance in view of recent improvements in the precision of the data acquisition system. In particular, the existence of local regions of separation, if any, in back portions of the circuit, and possible related unsteadiness, are of interest. Observations from that initial experiment did indicate some unsteady air flow problems in the cross leg, and thereafter the test region (Section A) was calibrated quantitatively. The intent was to learn something about the effect of upstream intermittent behavior flow on the test section flow, as well as to provide an extensive calibration as a standard for the effects induced by future alteration of the tunnel. Distributions of total pressure coefficients were measured first at one cross-section plane of the

test section, namely the model station. Data were obtained for several tunnel speeds. The reduced data yielded an unexpected distribution involving larger pressures along the inside wall. Author

N84-18089*# Massachusetts Inst. of Tech., Cambridge.
ADAPTATION OF TWO-DIMENSIONAL TRANSONIC ANALYSIS CODE, TSFOIL, FOR USE IN MODELING ADAPTIVE WALL TEST SECTIONS Final Report **c02**
Jonathan Webb *In its* A Coop. Program to Stimulate Student Involvement through the MIT Undergraduate Research Opportunity Program Jan. 1984 19 p refs (For primary document see N84-18086 08-80)
Avail: NTIS HC A05/MF A01 CSCL 01A

The effects of the elastic deformation of the wind tunnel wall held to a streamline-like shape were simulated numerically. The wall itself is simulated by a finite element model and is allowed to deform under the pressure loading developing in the wind tunnel with an airfoil model present. A modified version of the transonic analysis program, TSFOIL, is then used to determine the resulting flow field with the effects of the deformed wall included, the shape of the wall and the flow field. Once a result from a particular operating condition was obtained, the pressure distribution on the airfoil in the wind tunnel model is compared with solutions generated by TSFOIL in the free air mode. Author

N84-18090*# Massachusetts Inst. of Tech., Cambridge. Lab. for Computational Fluid Dynamics.
CALCULATING C-GRIDS WITH FINE AND EMBEDDED MESH REGIONS Final Report **c60**
Bernard Loyd *In its* A Coop. Program to Stimulate Student Involvement through the MIT Undergraduate Research Opportunity Program Jan. 1984 14 p refs (For primary document see N84-18086 08-80)
(CFDL-TR-83-7) Avail: NTIS HC A05/MF A01 CSCL 09B

A program for calculating a C-type mesh around airfoil like shapes is described. The Jameson/Caughey approach is used: a parabolic transformation coupled with a shearing transformation. The algebraic algorithm is capable of efficiently generating nearly orthogonal grids. A high degree of grid control is possible. The user may specify grid boundaries, number of grid lines, and location of (and spacing in) trailing edge and leading edge fine mesh areas. The capability of embedding fine mesh regions, for use with new adaptive grid techniques, is being developed. Grids generated by the program were used in Euler flow flow calculatons by W. Usab. Results superior to results calculated on previous O-type grids were obtained. Specifically, calculations converged faster using C-grids rather than 0-grids, total pressure loss spikes at the trailing edge of the airfoil were eliminated, and the Ni method converged with zero artificial smoothing for a subcritical case (resulting overall total pressure loss was then nearly zero). These improvements were attributed to higher grid orthogonality, especially at the trailing edge. The program itself is fairly straightforward. Roughly half of the 800 code lines are comment lines.
Author

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N84-18091# Brown Univ., Providence, R. I. Center for Dynamical Systems.
CONTROL AND IDENTIFICATION OF TIME VARYING SYSTEMS Annual Progress Report, 1 Jul. 1982 - 29 Jun. 1983
Allan E. Pearson Jun. 1983 7 p
(Grant AF-AFOSR-0230-82; AF Proj. 2304)
(AD-A135223; AFOSR-83-0936TR) Avail: NTIS HC A02/MF A01 CSCL 05/1

Research results are summarized for system parameter identification utilizing time limited input-output data. The results stem from two fundamentally different approaches, one of which stems from a projected integral equation error formulation and the other from a modulating function formulation for converting differential equations to functional equations. Applications include the parameter identification of differential-delay systems, delay estimation in received signals, identification of time varying systems, and estimating target acceleration in pursuit-evasion problems. Author (GRA)

N84-18092# Logistics Management Inst., Washington, D. C.
A STRATEGY FOR IMPROVING OVERHEAD COST CONTROL
R. S. Young and P. R. McClenon Apr. 1983 22 p
(Contract MDA903-81-C-0166)
(AD-A134661; LMI-NA302) Avail: NTIS HC A02/MF A01 CSCL 14/1

NAVAIR negotiators have few tools to use when forecasting and negotiating overhead costs to be included in noncompetitive contracts. This study outlines a strategy of organizational changes, educational programs, research efforts and policy initiatives to provide improvements in NAVAIR's ability to deal with this significant cost element. Author (GRA)

N84-18093# Los Alamos Scientific Lab., N. Mex.
PROBABILISTIC PLANNING AND BUDGETING FOR R AND D PROGRAMS INVOLVING ACTIVITIES OF HIGH UNCERTAINTY
Gregory J. Nunz Sep. 1983 30 p refs
(Contract W-7405-eng-36)
(DE84-002310; LA-9875-MS) Avail: NTIS HC A03/MF A01

A methodology is developed for probabilistic planning and budgeting programs containing large elements of uncertainty. The model uses PERT type temporal network analysis as a stochastic scheduling basis. Linear time dependencies are assigned to activity resources expenditures, which are combined to develop the parameters of total program budget and manpower requirement distributions. Bivariate analysis is conducted of the joint distributions of manpower against schedule and total cost against schedule in the form of covariance ellipses. The usefulness and pitfalls of this approach are discussed. DOE

N84-18094# Oak Ridge National Lab., Tenn. Mathematics and Statistics Research.
TWO-LEVEL COMPROMISE DESIGNS FOR ESTIMATING MAIN EFFECTS AND DETECTING INTERACTIONS
M. D. Morris and T. J. Mitchell Nov. 1983 35 p refs
(Contract W-7405-eng-26)
(DE84-002997; ORNL/CSD-126) Avail: NTIS HC A03/MF A01

A procedure for constructing experimental designs for use in estimating main effects, and detecting the presence of interactions in factorial models is described. The D-optimality and tr(L)-optimality are two design selection criteria used in constructing these compromise designs. A catalogue of compromise designs for $k = 4$ through 9 and $n = k + 2$ through $2k + 1$ is given, where k is the number of experimental factors and n is the number of experimental runs. DOE

N84-18095# Computer Horizons, Inc., Cherry Hill, N. J.
FURTHER DELINEATION OF THE UTILIZATION OF SCIENTIFIC LITERATURE BY U.S. PATENTS Final Report
Mark P. Carpenter, Francis Narin, and Paul R. McAllister 6 Dec. 1982 95 p refs
(Grant NSF PRA-79-20587; CHI Proj. 793-R)
(PB84-100734; NSF/PRA-82049) Avail: NTIS HC A05/MF A01 CSCL 05A

An assessment of the linkage between patents and fundamental research is described based on the extraction and analysis of the references in five rapidly growing subclasses of U.S. patents. References from the front page and body of more than 2000 U.S. patents were categorized as being references to other U.S. patents, to foreign patents, to the scientific journal literature or to other sources. The references to the scientific journal literature were further characterized according to their subject distribution, research level (applied to basic), age, institutional origins and support acknowledgements. In addition, the characteristics of the second

generation of scientific literature (the papers cited by the papers directly cited by patents) were tabulated. GRA

N84-18096# Computer Horizons, Inc., Cherry Hill, N. J.
FURTHER DELINEATION OF THE UTILIZATION OF SCIENTIFIC LITERATURE BY U.S. PATENTS. APPENDICES A: DISTRIBUTION OF REFERENCES CONTAINED IN PATENTS TO VARIOUS SOURCES
M. P. Carpenter, F. Narin, and P. R. McAllister 1982 238 p refs (Grant NSF PRA-79-20587)
(PB84-100742; NSF/PRA-82062) Avail: NTIS HC A11/MF A01 CSCL 05A

This appendix to the report lists the distribution of references contained in patents to various sources. Patent reference counts are presented by the year the patent was filed for chemical patents (analytical processes), electrical patents (light responsive semiconductors), mechanical patents (semiconductor manufacturing and medicinal applicators), and by the year and sector for electrical patents field effect devices. The subject and research level distribution of references and the age distribution of examiner and applicant references are noted. The distribution of second generation research papers by field, research level, sector, and support source is outlined. A sector cross-citing from U.S. and foreign owned patents to U.S. and foreign owned papers is included. A paper assessing the linkage between patents and fundamental research is presented. GRA

N84-18097# General Accounting Office, Washington, D. C. Resources Community Economic Div.
PROPOSED NATIONAL TECHNICAL INFORMATION SERVICE REVOLVING FUND
25 Aug. 1983 23 p
(PB84-103076; GAO/RCED-83-218; B-212184) Avail: NTIS HC A02/MF A01 CSCL 05A

The National Technical Information Service (NTIS) serves as the central Federal Clearing house for collecting and disseminating scientific information. To better manage and control its Clearinghouse operations, NTIS is seeking congressional approval to establish a public enterprise revolving fund. Public enterprise revolving funds are used for business conducted primarily with customers outside of the Government. The public enterprise fund could be an appropriate funding mechanism for the Clearinghouse. To increase congressional oversight of the proposed fund, GAO recommends several revisions to the legislation authorizing the fund. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N84-18098 Michigan State Univ., East Lansing.
THE EFFECT OF LOCUS OF CONTROL ON PERFORMANCE WITH MAN-MACHINE DIALOGUES Ph.D. Thesis
Richard Lee Hartley 1983 139 p
Avail: Univ. Microfilms Order No. DA8324720

This study focuses on the theory that performance in a man-machine interaction is based not only on cognitive skills and short term memory capacity but is also affected by anxiety. The anxiety of concern is that which might be produced when individuals with specific personality attributes use specific types of computer software that are not compatible with their personal approach to problem-solving. The personality trait selected was based on the importance accorded it in the literature. This attribute is 'locus of control'--the degree to which individuals view events as occurring as result of their personal actions. Two sets of computer programs were used on an IBM personal computer to simulate dialogues that either: (1) gives the user very limited control over the interaction, or (2) gives the user considerable control. The sample consisted of undergraduate business students. The task performed in the study was limited to a data entry operation. Dissert. Abstr.

N84-18099 Pennsylvania Univ., Philadelphia.
A METHOD OF MEASUREMENT OF BEHAVIORAL FACTORS AFFECTING INFORMATION SYSTEMS DESIGN AND USE: AN APPLICATION OF MULTIDIMENSIONAL SCALING IN UNCOVERING INDIVIDUAL PSYCHOLOGICAL STRUCTURE Ph.D. Thesis
Stuart Arthur Harris 1983 229 p
Avail: Univ. Microfilms Order No. DA8326295

The objective of this research was to identify underlying psychological structures of individuals for whom a computer based, information system was designed. The initial stage entailed adapting a testing and analysis procedure to a user/computer environment. The Semantic Differential, a psychological testing procedure for 'measuring meaning', was selected for testing subjects. Multidimensional Scaling (MDS) was utilized in the analysis of test data. Sixteen models based on individual and organizational behavioral, perceptual, decision making, and planning factors were identified as candidates for influencing test subjects who were responsible for the specification of their information systems. The psychological factors were selected from the disciplines of Decision Science, Management and Organizational Behavior, Planning Theory, and Information Systems Theory. The test questionnaire was then constructed from the factor models. Dissert. Abstr.

N84-18100# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
GEOGRAPHY INFORMATION SYSTEMS PROJECT [PROJETO DE UM SISTEMA GEOGRAFICO DE INFORMACAO]
Gilberto Camara Neto, Flavio R. D. Velasco, and Julia Leocadia deOliveira Jun. 1983 20 p refs In PORTUGUESE; ENGLISH summary Presented at the 10th Integrated Software and Hardware Seminar, Campinas, Brazil, 25-29 Jul. 1983
(INPE-2782-PRE/348) Avail: NTIS HC A02/MF A01

A geographic information system (GIS) project that enables combining of satellite imagery and other data such as maps and reports is described. The main technical difficulties in a GIS project are discussed, as well as the solution found in the literature and the options chosen for the GIS. Author

N84-18101# Mathematisch Centrum, Amsterdam (Netherlands).
QUERY PROCESSING AND DATA ALLOCATION IN DISTRIBUTED DATABASE SYSTEMS
P. M. G. Apers 1983 212 p refs Sponsored by the Netherlands Organization for the Advancement of Pure Research
(Math-Centre-Tracts-156; ISBN-90-6196-251-X) Avail: NTIS HC A10/MF A01

A tutorial on distributed databases is given. Besides the advantages some of the fundamental problems, which still require research, query processing and data allocation problems are discussed. The problem of query processing is treated. Different cost functions are defined to measure the efficiency of a processing schedule. Low level operations that manipulate storage structures are considered. Processing schedules that minimize either the response time or the total time are constructed. A qualitative and quantitative comparison is made between the algorithms proposed and already existing algorithms. The problem of allocating the data of a database is investigated. Author

N84-18102*# National Aeronautics and Space Administration, Washington, D. C.
ROTARY WING AIRCRAFT AND TECHNICAL PUBLICATIONS OF NASA, 1970 - 1982
John D. Hiemstra, comp. Jul. 1982 289 p
(NASA-TM-85521; NAS 1.15:85521) Avail: NTIS HC A13 CSCL 05B

This bibliography cites 933 documents in the NASA RECON data base which pertain to rotary wing aircraft. The entries are arranged in descending order by publication data except for the

NASA-supported documents which are arranged in descending order by accession date. A.R.H.

N84-18103# Arinc Research Corp., Annapolis, Md.
AUTOMATED DATA BASE IMPLEMENTATION REQUIREMENTS FOR THE AVIONICS PLANNING BASELINE, ARMY
M. Sperato and R. Mead Jul. 1983 113 p
(Contract DAAB07-78-A-6606)
(AD-A135259; Rept-2846-01-TR-3062) Avail: NTIS HC A06/MF A01 CSCL 09/2

The U.S. Army Avionics Research and Development Activity intends to establish the use of the Avionics Planning Baseline-Army (APB-A) document as an important facet of the formal avionics planning process. The APB-A was designed to maintain maximum compatibility in both form and content with similar avoinics planning documents published by the Air Force and the Navy. This overall compatibility should facilitate the exchange of information among the three services for the identification of avionics standardization opportunities. The first edition of the APB-A was the product of the collection and manual assembly of avionics planning data for current and future planned Army aircraft into a report format similar to that of the Air Force Avionics Planning Baseline and the Navy Avionics Planning Baseline. This technical report addresses the requirements for implementing an automated version of the Army avionics data base compatible with existing Air Force and Navy data base architectures and capable of mechanizing the production of the APB-A. The complete automated system will be documented in a future report. Author (GRA)

N84-18104# Stanford Univ., Calif. Dept. of Computer Science.
THE PROGRAM COMPLEXITY OF SEARCHING A TABLE
H. G. Mairson Oct. 1983 17 p
(Grant AF-AFOSR-0212-80; AF Proj. 2304)
(AD-A135299; AFOSR-83-0960TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Given a fixed set S of n keys, we would like to store them so that queries of the form 'Does the point X belong to the set S?' can be answered quickly. A commonly employed scheme to solve this problem uses a table to store the keys, and a special purpose program depending on S which probes the table. We analyze the tradeoff between the maximum number of probes allowable to answer a query, and the information-theoretic complexity of the program to do so. Perfect hashing (where the query must be answered in one probe) has a program complexity of n times the log e to the base e (1+0(1)) bits, and this lower bound can be achieved. Under a model combining perfect hashing and binary search methods, it is shown that for k probes to the table nk/2 to the k+1 power (1+0(1)) bits are necessary and sufficient to describe a table searching algorithm. This model gives some information-theoretic bounds on the complexity of searching an external memory. Finally, we prove some lower bounds on the worst case performance of hash functions described by bounded Boolean circuits, and worst case performance of universal classes of hash functions. GRA

N84-18105# Texas Univ., Austin. Dept. of Computer Sciences.
[DISTRIBUTED ALGORITHMS FOR VARIOUS PROBLEMS] Annual Scientific Report, 15 Jun. 1982 - 14 Jun. 1983
K. M. Chandy and J. Misra Sep. 1983 16 p
(Grant AF-AFOSR-0205-81; AF Proj. 2304)
(AD-A135452; AFOSR-83-0993TR) Avail: NTIS HC A02/MF A01 CSCL 05/2

In the last several years, the investigators have developed a number of important, practical distributed algorithms for problems such as distributed simulation, termination and deadlock detection, computing networkwide functions in a distributed manner, etc. Interest in distributed systems has spurred publications of many distributed algorithms by other researchers. The major thrust in the past year has been directed towards developing unifying frameworks, i.e, paradigms - which consolidate the known results. They have developed a theory for detecting all system properties that are stable, i.e., properties that continue to hold once they begin to hold. Examples of stable properties are termination, deadlock, etc. The work subsumes a large body of literature on termination and deadlock detection. They have similarly developed a theory of conflict resolution and an algorithm based on this theory. This algorithm subsumes all known nonprobabilistic algorithms for mutual exclusion, resource sharing, dining philosophers' problem, etc. In addition, they have continued work on models of distributed systems, their verification and performance analysis. Author (GRA)

N84-18106# Maryland Univ., College Park. Computer Science Center.
THEORY OF IMAGE ANALYSIS AND RECOGNITION Final Scientific Report, 1 May 1977 - 31 Dec. 1982
A. Rosenfeld and L. S. Davis 24 Jan. 1983 12 p
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A135453; AFOSR-83-0983TR) Avail: NTIS HC A02/MF A01 CSCL 05/2

The research conducted under the grant was concerned with three theoretical aspects of image analysis: (1) statistical image modeling and texture analysis; (2) digital geometry (geometrical properties of subsets of digital images); and (3) parallel image processing (including formal models for parallel image recognition). During the period 1 May 1977-31 Dec 1982, 116 technical reports were issued on the grant. Nearly all of these have been published or in process of acceptance for publication. A bibliography of these reports is given. Seven students wrote Ph.D. dissertations with the support of the grant. Author (GRA)

N84-18107# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A PROGRAM FOR DEVELOPING AUTOMATED SCIENTIFIC-INFORMATION PROCESSING IN MARITIME ECONOMY
T. Ciundziewicki and T. Piotrowski 17 Nov. 1983 11 p Transl. into ENGLISH from Techn. i Gospodarka Morska (Poland), v. 27, no. 4(310), Apr. 1977 p 205-206
(AD-A135518; FTD-ID(RS)T-1525-83) Avail: NTIS HC A02/MF A01 CSCL 05/2

The need for efficient means to acquire scientific and technical information is addressed. The shotcomings of the present automated systems are surveyed. Finally, basic requirements for further development of an automated scientific information system are outlined. J.M.S.

N84-18108# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN APPROACH TO THE DESIGN OF A MANAGEMENT INFORMATION SYSTEM: DEVELOPMENT PROCEDURE FOR THE INDONESIAN DEFENSE LOGISTICS STAFF M.S. Thesis
E. S. Wreksomindojo Sep. 1983 85 p
(AD-A134974; AFIT-LSSR-61-83) Avail: NTIS HC A05/MF A01 CSCL 05/2

The roles and participation of the managers in the Office of the Indonesian Defense Logistics Assistant has always been a major important factor in the establishment of the Indonesian Defense Logistics Management Information System (MIS). The objective of this research was to develop a procedure to describe the basic roles of these managers during the MIS development. A review of classical system development methodologies and factors affecting the success and failure of MIS was used as a foundation for developing the procedures. The seven steps of MIS design as outlined by Joel E. Ross was selected, enumerated, and applied to the Office of the Indonesian Defense Logistics Assistant environment. Further analysis on Determination of Information Needs was used as an example. Although additional research involving how to implement the managers' roles in the MIS development will be needed, this research will become a useful MIS development reference guide for the managers in the Office of the Indonesian Defense Logistics Assistant.
Author (GRA)

N84-18109# Office of Naval Research Liason Office, Far East, APO, San Francisco, Calif.
ONR FAR EAST SCIENTIFIC BULLETIN. VOLUME 8, NO. 3,

JULY - SEPTEMBER 1983 Quarterly Report
Sachio Yamamoto and Mary Lou Moore Sep. 1983 120 p
(AD-A134272) Avail: NTIS HC A06/MF A01 CSCL 05/2

This is a quarterly publication presenting articles covering recent developments in Far Eastern (particularly Japanese) scientific research. It is hoped that these reports (which do not constitute part of the scientific literature) will prove to be of value to scientists by providing items of interest well in advance of the usual scientific publications. The articles are written primarily by members of the staff of ONR Far East, with certain reports also being contributed by visiting stateside scientists. Occasionally a regional scientist will be invited to submit an article covering his own work, considered to be of special interest. Author (GRA)

N84-18110# Los Alamos Scientific Lab., N. Mex.
MULTIDOMAIN, MULTIRECORD-TYPE DATATRIEVE-11 DATABASES
Robert R. Horning 1983 7 p Presented at the US Fall DECUS Symp., Las Vegas, Nev., 24-28 Oct 1983
(Contract W-7405-eng-36)
(DE84-001707; LA-UR-83-2980; CONF-8310182-3) Avail: NTIS HC A02/MF A01

Data bases consisting of multiple domains and multirecord-type domains present special problems in design, loading, maintenance, and report generation. The logical association of records is a fundamental concern in all these problem areas. Techniques for dealing with this and other specifics using Datatrieve-11, Sort-11, FORTRAN 77, and the RSX-11M Indirect Command File Processor are described. DOE

N84-18111# Office of Management and Budget, Washington, D.C.
MEETING THE AUTOMATIC DATA PROCESSING AND TELECOMMUNICATIONS NEEDS OF THE FEDERAL GOVERNMENT: A FIVE-YEAR PLAN
Apr. 1983 178 p
(PB83-195255) Avail: NTIS HC A09/MF A01 CSCL 05B

Telecommunications technology outlook, computer technology outlook, budget and acquisition plans, dealing with rapid ADP technological advances, upgrade savings, end uses computing, and future telecommunications systems are discussed. Author

N84-18112# Washington Univ., Seattle.
SCIENTIFIC AND TECHNICAL INFORMATION SYSTEM FOR THE WASHINGTON STATE LEGISLATURE
Larry Meyer May 1983 11 p refs
(Grant NSF ISP-80-19579)
(PB84-100650; NSF/ISP-83016) Avail: NTIS HC A02/MF A01 CSCL 05B

A scientific and technical information system is suggested for implementation by the Washington State legislature. The system would use legislative staff to process scientific and technical information in a regular, controlled, and organized manner, and would provide legislators with only the scientific and technical information they need. The system has three major components: (1) identification of scientific and technical components of public issues and the relevant sources of information and expertise; (2) mobilization of scientific and technical resources so that questions can be assimilated and responses issued systematically; and (3) communication of issues, advice, information, and analyses from the scientific and technical resource base to legislators. GRA

N84-18113# Rutgers - The State Univ., New Brunswick, N. J.
SERVICES FOR THE ANALYSIS AND EVALUATION OF INFORMATION Final Report
H. J. Hall 22 Dec. 1982 127 p
(Grant NSF-67016628)
(PB84-104504) Avail: NTIS HC A07/MF A01 CSCL 05B

Skilled services for the analysis and evaluation of information (IAE) go beyond searching and retrieval to provide information that is critically evaluated for use. This is a study of what IAE is and does, based on field interviews and extensive seminar discussions with information managers, analysts, and major users. The IAE is a form of team research that depends on one-to-one interactions between the information customer, the research user, and an experienced professional analyst. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N84-18114# Committee on Science and Technology (U. S. House).
RESEARCH AND DEVELOPMENT JOINT VENTURES
Washington GPO 1984 185 p Hearings before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., No. 43, 12 Jul. 1983
(GPO-26-312) Avail: Subcommittee on Science, Research and Technology

Legislation that would modify antitrust laws with respect to research joint ventures is considered. An attempt to eliminate the disincentive in terms of antitrust risk associated with companies joining together to conduct what can only be viewed from a national perspective as constructive, procompetitive research and development activities is discussed. S.L.

N84-18115# Committee on Science and Technology (U. S. House).
JOINT INDUSTRY/UNIVERSITY COOPERATION WITH FEDERALLY SUPPORTED RESEARCH FACILITIES
Washington GPO 1983 180 p Hearing before the Subcomm. on Invest. and Oversight of the Comm. on Sci. and Technol., 98th Congr., 1st Sess., No. 32, 13 May 1983
(GPO-24-902) Avail: Subcommittee on Investigations and Oversight

Testimony is presented which examines how the joint use of federally supported research facilities might enhance the national research endeavor, reduce levels of direct taxpayer support, benefit the overall technology transfer process, and increase innovation and productivity. Particular attention is given to the use of unique facilities within large laboratory complexes for the solution of problems in agriculture, water research, and high technology. A.R.H.

N84-18116# Committee on Science and Technology (U. S. House).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACT, 1985
Washington GPO 1984 10 p A bill referred to the Comm. on Sci. and Technol., 98th Congr., 2nd Sess., 8 Feb. 1984
Avail: US Capitol, House Document Room

Appropriations to the National Aeronautics and Space Administration for research and development, space flight, control and data communications, construction of facilities, and research and program management, and for other purposes were authorized. Author

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N84-18117*# Mechanical Technology, Inc., Latham, N. Y.
AUTOMOTIVE STIRLING ENGINE DEVELOPMENT PROGRAM Semiannual Technical Progress Report, 1 Jan. - 30 Jun. 1983
N. Nightingale, W. Ernst, A. Richey, M. Simetkosky, G. Smith, C. Rohdenburg, and M. Antonelli, ed. Aug. 1983 87 p
(Contracts DEN3-32; DE-AI01-77CS-51040)
(NASA-CR-168205; DOE/NASA/0032-21; NAS 1.26:168205; MTI-83ASE334SA4) Avail: NTIS HC A05/MF A01 CSCL 13F

Program status and plans are discussed for component and technology development; reference engine system design, the upgraded Mod 1 engine; industry test and evaluation; and product assurance. Four current Mod 1 engines reached a total of 2523 operational hours, while two upgraded engines accumulated 166 hours. A.R.H.

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N84-18118 Rochester Univ., N. Y.
TIME-VARYING SPECKLE PHENOMENA IN ASTRONOMICAL IMAGING AND IN LASER SCATTERING Ph.D. Thesis
Kevin Arthur ODonnell 1983 286 p
Avail: Univ. Microfilms Order No. DA8321690

The properties of time-varying speckle phenomena in stellar imaging through turbulence and in laser scattering from moving diffusers are examined in both theory and experiment. It is found that the space-time correlation properties of stellar speckle images are important in stellar speckle interferometry, a method of obtaining diffraction limited information through the atmosphere. A theoretical study of exposure time effects in speckle interferometry reveals that the optimum exposure time is dependent on the space-time properties of the stellar image. A method of space-time speckle interferometry that may overcome exposure time effects of standard methods is also proposed. An experimental investigation of the space-time intensity correlation functions of the speckle image at two observing sites reveals rather different correlation structure. At Mees Observatory in Bristol Springs, New York, the image correlations indicate that translation of pupil turbulence was significant, while measurements at Mauna Kea Observatory in Hawaii suggest that boiling of turbulence rather than translation was the predominant effect. Dissert Abstr.

N84-18119*# Colorado Univ., Boulder. Lab. for Atmospheric and Space Physics.
STELLAR ULTRAVIOLET ROCKET RESEARCH PROGRAM Final Report
[1984] 9 p refs
(Grant NGR-06-003-176)
(NASA-CR-175361; NAS 1.26:175361) Avail: NTIS HC A02/MF A01 CSCL 03A

A 1/4 meter ultraviolet spectrometer, developed to measure ultraviolet flux from several standard type stars was flown successfully on Aerobee rockets. The ultraviolet flux from alpha Lyr, eta U Ma, zeta Oph, delta Ori, alpha CMa, beta CMa, and alpha Leo were measured. These values agreed with the OAO data obtained by Code in the 1200 to 3400 A region to + or - 9%. The design and calibration of a faint object spectrometer for observing stars and nebula with a 3 A resolution and a 3% accuracy in a 60 second observation are discussed. A.R.H.

N84-18120*# California Univ., Santa Cruz.
LUMINOSITY CALIBRATION OF LOW REDSHIFT QUASARS Final Technical Report, 15 Apr. 1981 - 31 Jul. 1983
E. Joseph Wampler 31 Jul. 1983 4 p
(Grant NAG5-275)
(NASA-CR-175372; NAS 1.26:175372) Avail: NTIS HC A02/MF A01 CSCL 03A

European (SERC) were combined with U.S. shifts on the IUE in order to obtain the long integration times required to record spectra of faint quasars. LWR spectra of the nearby giant radio galaxy Centarus A(NGC 5548) was attempted in an effort to determine the chemical composition and stellar populations in this unusual galaxy. The IUE results from the low redshift quasar study, combined with the data from an extensive ground based survey, are described. Author

N84-18121*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
COMBINED ULTRAVIOLET STUDIES OF ASTRONOMICAL SOURCES Semiannual Progress Report, 1 Feb. - 31 Jul. 1983
A. K. Dupree, M. S. Giampapa, J. P. Huchra, R. W. Noyes, L. W. Hartmann, J. C. Raymond, W. P. Blair, G. D. Bothun, J. O. Patterson, S. L. Baliunas et al Oct. 1983 12 p
(Grant NAG5-87)
(NASA-CR-175377; NAS 1.26:175377; SAPR-6) Avail: NTIS HC A02/MF A01 CSCL 03A

Ultraviolet spectra of non-radiataive shock waves grain destruction and elemental abundances in interstellar shocks, carbon abundance in M33 and M31 from supernova remnants, determination of the mass function in the large Magellanic cloud, UV spectra of white dwarf pulsars, stellar flares, availability of the double quasar Q 0957 + 56' AB, spectra of late-F dwarfs and their relation to rotation, dynamics of hot gas surrounding hybrid stars, high resolution study of epsilon coronae Austriual, active regions on solar-type dwarfs as a function of rotation rate and age, coordinated chromospheric synoptic observations of selected late-type stars, the two-component atmosphere of Lambda Andromedae, and activity in Hyades giants are discussed. N.W.

N84-18122*# California Inst. of Tech., Pasadena. Lab. of Physics.
OBSERVATIONS OF EMISSION IN BRIGHT, LOW REDSHIFT QUASARS Final Technical Report
[1983] 11 p
(Grant NAG5-47)
(NASA-CR-175376; NAS 1.26:175376) Avail: NTIS HC A02/MF A01 CSCL 03A

Ultraviolet, infrared, and optical spectra were combined to obtain a data set sample as broad as possible in the range of hydrogen lines in individual quasars. From the measured Lyman fluxes, coupled with Balmer and Paschen line fluxes measured in these same objects, an effort was made to establish observational constraints that would guide models of the broad emission line regions of quasars. It was found that IUE spectra were generally of sufficiently high quality to derive line profiles of the ultraviolet lines Lyman alpha and CIV 1550 A, which were compared to the Balmer line profiles. The objects observed and the line fluxes are tabulated. Plots of line profiles are included. A.R.H.

N84-18123*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MODELS OF THE HARD X-RAY SPECTRUM OF AM HERCULIS

AND IMPLICATIONS FOR THE ACCRETION RATE
J. H. Swank, A. C. Fabian, and R. R. Ross Dec. 1983 40 p refs Submitted for publication
(NASA-TM-86045; NAS 1.15:86045) Avail: NTIS HC A03/MF A01 CSCL 03A

Phenomenological fits to the hard X-ray spectrum of AM Herculis left unexplained the high equivalent width (0.8 + or - 0.1 keV) of Fe K alpha emission. A purely thermal origin implies a much steeper spectrum than was observed. With Monte Carlo calculations, scattering and fluorescent line production in a cold or partially ionized accretion column of hard X-rays emitted at the base were investigated. The strength of the iron emission and the flat spectral continuum can be explained by the effects of fluorescence and absorption within the accretion column and the surface of the white dwarf on a thermal X-ray spectrum. Thomson optical depths across the column in the range 0.2 to 0.7 are acceptable. The accretion rate and gravitational power can be deduced from the optical depth across the column, if the column size is known, and, together with the observed hard X-ray and polarized light luminosities, imply a lower limit for the luminosity in the UV to soft X-ray range, for which the observations give model-dependent values. Estimates of the column size differ by a factor of 40. Small spot sizes and low luminosities would be consistent with the soft component being the expected re-processed bremsstrahlung and cyclotron radiation, although the constraint of matching the spectrum confines one to solutions with fluxes exceeding 20% the Eddington limits. M.G.

N84-18124# Hamburg Univ. (West Germany). Inst. Fuer Astrophysik und Extraterrestrische.
THE CELESTIAL MECHANICS EXPERIMENT (E 11) OF HELIOS Final Report, Jan. 1983
Eckhard Krotscheck and Wolfgang Kundt (Bremen Univ. West Germany) Bonn Bundesministerium fuer Forschung und Technologie Aug. 1983 96 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-83-016; ISSN-0170-1339) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20

Distance measurements between Earth and spacecraft were to be studied for the testing of Einstein's theory at a level of > 1%. When this could not be achived due to early burnout of the amplifier tubes, a Conversational Spacecraft and Missile Observation System (COSMOS) was set up. It features an orbit evaluation code for a heavy n-body-system which is acted upon, at the same time, by several parametrized nongravitational perturbing forces and which is monitored with range and Doppler measurements. All nongravitational forces on the spacecraft were modelled. Surface temperatures measured on board imply an unexpectedly high worsening of the mirrors, with values > 0.5 of the absorption coefficient after 10 yr in orbit, probably due to coloring of the covering glass. Author (ESA)

N84-18125# Royal Greenwich Observatory, Herstmonceux (England).
FIRST, SECOND AND THIRD HERSTMONCEUX CATALOGUES OF STARS FOR 1950.0
R. H. Tucker, M. E. Buontempo, P. Gibbs, and R. H. D. Swifte 1983 56 p refs Document includes a microfiche supplement
(Bull-189; ISSN-0308-5074) Avail: NTIS HC A04/MF A01; Royal Greenwich Observatory, Herstmonceux, United Kingdom £10

Results of observations of stars made at the Royal Greenwich Observatory (Herstmonceux) with the Cooke Transit Circle from 1957 October 22 to 1980 November 18 are presented. Fundamental, variable, and daggered stars (FK3 stars not in FK4) are covered. Author (ESA)

N84-18126# Royal Greenwich Observatory, Herstmonceux (England).
NARROW-BAND PHOTOMETRY OF FAINT RED STARS, 2
J. B. Alexander, D. H. P. Jones, and J. E. Sinclair 1983 47 p refs
(Bull-191; ISSN-0308-5074) Avail: NTIS HC A03/MF A01; Royal Greenwich Observatory, Herstmonceux, United Kingdom £7

In order to discover the space density of lower main sequence stars in the solar neighborhood, a catalog of photoelectric narrow-band observations on a system defined by 4 interference filters, with nominal wavelengths of 6076, 6830, 7100 and 7460A was established. Magnitudes and colors of 1252 stars, mostly of spectral type M, are given. Most of the stars can be unambiguously separated into giants or dwarfs. The number of dwarfs, however, is too small to make an accurate estimate of their number density in the solar neighborhood. The majority of stars fainter than V = 12 at high galactic latitudes are dwarfs. The density of red dwarfs can be found from these observations and it appears that the principle uncertainty in the density arises from the Poissonian statistics of small numbers. The uncertainty in dwarf/giant separation contributes only a small additional uncertainty. Author (ESA)

N84-17231*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
STEP FLIGHT EXPERIMENTS LARGE DEPLOYABLE REFLECTOR (LDR) TELESCOPE
F. C. Runge *In* NASA. Langley Research Center STEP Expt. Requirements Jan. 1984 p 257-278 (For primary document see N84-17211 08-15)
Avail: NTIS HC A15/MF A01 CSCL 03A

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N84-18127 Academy of Sciences (USSR), Moscow. Space Research Inst.
BELT OF LIFE IN THE GALAXY
L. S. Marochnik and L. M. Mukhin 1983 19 p refs
(PR-761) Copyright. Avail: Issuing Activity

The hypothesis is substantiated, according to which technological civilizations of our type can originate in the Galaxy in a 'belt of life', a narrow circular zone with the galactic orbit of the Sun inside. This zone is characterized by specific conditions due to the corotation circle, an exceptional region of the Galaxy, passing through it. In the belt of life, birth and death of civilizations should apparently occur in spiral arms because of supernova explosions. In this case, the lifetime of a civilization is the time of its motion along Galactic orbit between the adjacent spiral arms. In 3.3 x 10(9) years our civilization will enter the Perseus arm. It can be expected that in the Galaxy the ratio of the probable number of civilization at a higher level than ours - technological level to that at a 'lower' technological level is of the order of 0.7. Author

N84-18128 California Inst. of Tech., Pasadena.
THE PHYSICAL NATURE OF THE CONTINUUM IN ACTIVE GALAXIES Ph.D. Thesis
Matthew Arnold Malkan 1983 185 p
Avail: Univ. Microfilms Order No. DA8325745

The intrinsic nonstellar continuum from the nuclei of a wide range of active galaxies was measured. Little or no continuum reddening (from the 2175A absorption bump) above that expected from the interstellar medium of the Milky Way was found. Nor do optical and ultraviolet emission from permitted Fe II lines alter the overall appearance of the energy distribution very much. After accounting for hydrogen recombination radiation, the continuum consists of a power law, closely related to the X-ray emission, and an optically thick thermal component was found. Some bright quasars produce as much or more thermal power as nonthermal. The thermal energy has an average characteristic temperature of 20 to 30,000 K. Relativistic accretion disk models which include the gravitational redshifting and focusing of emerging light were described. These models are completely specified by two well-

determined parameters: the mass of the central black hole and the accretion rate. Dissert. Abstr.

N84-18129 California Inst. of Tech., Pasadena.
TURBULENCE AND MASS MOTION IN GALACTIC MOLECULAR CLOUDS Ph.D. Thesis
Stephen Morris Lichten 1984 182 p
Avail: Univ. Microfilms Order No. DA8325744

The origin and maintenance of supersonic gas motions in dense molecular clouds is examined. Millimeter wavelength CO line profiles whose broad wings and self-reversals provide clues about the nature of the observed supersonic motions are modeled and interpreted. Broad molecular line wings provide evidence for high-velocity bipolar gas flows powdered by strong stellar winds. The self-reversed CO line profiles are due in part to radiative transfer effects in molecular clouds which, in some cases, are expanding or contracting; Monte Carlo simulations of radiative transfer, however, demonstrate that cloud fragmentation may be responsible for some observed properties of the line profiles. The detection of broad-wing sources in quiescent, dark nebulae, shows that energetic outflows are common in a wide range of molecular clouds. Dissert. Abstr.

N84-18130 Maryland Univ., College Park.
FORMATION OF DUST LANES IN SPIRAL GALAXIES BY RADIATION PRESSURE Ph.D. Thesis
Sumant Krishnaswamy 1982 128 p
Avail: Univ. Microfilms Order No. DA8323554

The possibility is explored that the dust lanes frequently observed along the spiral arms of spiral galaxies are, at least in part, a result of shock compression of the gas caused by radiation pressure, due to hot, young stars, independent of any underlying gravitational density wave. The interstellar medium is treated as a compressible, supersonic, inviscid, isothermal, fluid dynamic system subject to a 1/r radiation force from a line source of luminosity representing the luminous spiral arm. The gas is confined by the gravitational force normal to the disk (the z-direction) and is assumed to have a free-stream normal velocity relative to the radiation source of Mach 1.2 for an isothermal sound speed of 10 km 1/s. Dissert. Abstr.

N84-18131*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
POWER SPECTRAL SIGNATURES OF INTERPLANETARY COROTATING AND TRANSIENT FLOWS
M. L. Goldstein, L. F. Burlaga, and W. H. Matthaeus Jan. 1984 47 p refs
(NASA-TM-86051; NAS 1.15:86051) Avail: NTIS HC A03/MF A01 CSCL 03B

Studies of the time behavior of the galactic cosmic ray intensity have concluded that long term decreases in the intensity are generally associated with systems of interplanetary flows that contain flare generated shock waves, magnetic clouds and other transient phenomena. The magnetic field power spectral signatures of such flow systems are compared to power spectra obtained during times when the solar wind is dominated by stable corotating streams that do not usually produce long-lived reduction in the cosmic ray intensity. The spectral signatures of these two types of regimes (transient and corotating) are distinct. However, the distinguishing features are not the same throughout the heliosphere. In data collected beyond 1 AU the primary differences are in the power spectra of the magnitude of the magnetic field rather than in the power in the field components. Consequently, decreases in cosmic ray intensity are very likely due to magnetic mirror forces and gradient drifts rather than to small angle scattering due to cyclotron wave-particle interactions. S.L.

N84-18132*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MILGROM'S REVISION OF COSMIC DYNAMICS: AMENDING NEWTON'S LAWS OR KEPLERS?
James E. Felten (Maryland Univ., College Park) Dec. 1983 15 p refs Submitted for publication
(NASA-TM-86049; NAS 1.15:86049) Avail: NTIS HC A03/MF A01 CSCL 03B

Milgrom's recent revision of Newtonian dynamics was introduced to eliminate the inference that large quantities of invisible mass exist in galaxies. Simple examples show that a Milgrom acceleration, in the form presented so far, imply other far-reaching changes in dynamics. The momentum of an isolated system is not conserved, and the usual theorem for center-of-mass motion of any system does not hold. Naive applications require extreme caution. The model fails to provide a complete description of particle dynamics and should be thought of as a revision of Kepler's laws rather than Newton's. The Milgrom acceleration also implies fundamental changes in cosmology. A quasi-Newtonian calculation adapted from Newtonian cosmology suggests that a Milgrom universe will recollapse even if the classical closure parameter theta is less than 1. The solution, however, fails to satisfy the cosmological principle. Reasons for the breakdown of this calculation are examined. A theory of gravitation needed before the behavior of a Milgrom universe can be predicted. S.L.

N84-18133# Naval Academy, Annapolis, Md.
DETERMINATION OF INDIVIDUAL TEMPERATURES AND LUMINOSITIES IN ECLIPSING BINARY STAR SYSTEMS Final Report, 1982 - 1983
Robert M. Campbell 20 Jun. 1983 107 p
(AD-A134182; USNA-TSPR-122) Avail: NTIS HC A06/MF A01 CSCL 03/2

The purpose of this project was to determine the temperatures and luminosities of the individual components of eclipsing binary star systems. The information was gained by UBV photometry of a system at total eclipse and at a time outside eclipse. The light at totality is due entirely to the occulting star, and outside eclipse, both stars contribute fully. A method is derived for subtracting out the light of the occulting star to obtain measurements of the occulted. Systems for which a complete solution (temperature and luminosity of both components) was reached include: TU Camelopardi, TW Draconis, AK Herculis, V566 Ophiuchi, W Ursae Majoris, and AG Virginis. Systems observed only during totality, thus solving only the occulting star, include alpha Corona Borealis and AM Leonis. RS Canes Venatici and TZ Bootes were observed only out of eclipse, and must await further study. Once a solution for a system was obtained, it was presented graphically on a Hertzsprung-Russell diagram, and was examined from the viewpoint of binary evolution. GRA

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N84-18134 Academy of Sciences (USSR), Moscow. Space Research Inst.
PROPOSALS FOR VIRA (VENUS INTERNATIONAL REFERENCE ATMOSPHERE): CHEMICAL COMPOSITION OF ATMOSPHERE BELOW 100 KM
V. I. Moroz, V. G. Istomin, and L. M. Mukhin 1983 17 p refs
(PR-830) Copyright. Avail: Issuing Activity

Tables of data indicating the chemical composition of the Venus' atmosphere are given. The data came from mass-spectroscopy, gas chromatography, optical spectroscopy in the deep layers of the atmosphere, and gas analysis by mean of specific chemical reactions. Measurements from the Venera and Pioneer probes are given. R.J.F.

N84-18135 Academy of Sciences (USSR), Moscow. Space Research Inst.
PROPOSALS FOR VIRA (VENUS INTERNATIONAL REFERENCE ATMOSPHERE): SOLAR AND THERMAL RADIATION

V. I. Moroz, A. P. Ekonomov, and B. E. Moshkin 1983 34 p refs
(PR-829) Copyright. Avail: Issuing Activity

Values are determined for: (1) the solar flux on the orbit of Venus; (2) albedo and effective temperature; (3) outgoing thermal radiation; spectrum, angle, latitude, and time dependence; (4) solar radiation at the surface of Venus; (5) spectral, altitude, and angular distribution of solar radiation in the low atmosphere; and (6) thermal infrared fluxes in low atmopsheres. Results are shown in tables and graphs. A.R.H.

N84-18136*# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
A DAWN TO DUSK ELECTRIC FIELD IN THE JOVIAN MAGNETOSPHERE
C. K. Goertz (Iowa Univ.) and W.-I. Ip 1983 32 p refs
(Contract NAS2-6553)
(NASA-CR-166463; NAS 1.26:166463; U-of-Iowa-83-4) Avail: NTIS HC A03/MF A01 CSCL 03B

It is shown that if Io-injected plasma is lost via a planetary wind-fixed Birkeland current system may result. This is due to the fact that the azimuthal centrifugal current flows across a density gradient produced by the loss of plasma through the planetary wind in the tail. The divergent centrifugal current is connected to field-aligned Birkeland currents which flow into the ionosphere at dawn and out of it at dusk. The closure currents in the ionosphere require a dawn to dusk electric field which at the orbit of Io is estimated to have a strength of 0.2 mV/m. However, the values of crucial parameters are not well known and the field at Io's orbit may well be significantly larger. Independent estimates derived from the local time asymmetry of the torus UV emission indicate a field of 1.5 mV/m. M.G.

N84-18137*# Wisconsin Univ., Madison. Space Science and Engineering Center.
MORPHOLOGY AND MOVEMENTS OF POLARIZATION FEATURES ON VENUS Final Report, 1 Jan. 1981 - 30 Nov. 1982
Sanjay S. Limaye 30 Nov. 1982 86 p refs
(Grant NAG2-93)
(NASA-CR-166464; NAS 1.26:166464) Avail: NTIS HC A05/MF A01 CSCL 03B

Ground and spacecraft based polarization observations of Venus detected the signature of the so called 1-micron radius cloud particles that constitute the main cloud deck on Venus, as well as that of sub-micron sized particles that form a haze above this main cloud layer. Whether such observations showed any local clustering or organization in the polarimetry data remained uncertain until the relatively high resolution observations from the Pioneer Venus Orbiter Cloud Photopolarimeter (OCPP) became available. The available polarization data from this instrument was studied to see whether local organization was present, to study the morphology of such features or polarization clouds, and finally, to see if they can be followed in a sequence of observations to study their motions. M.G.

N84-18138*# California Univ., Los Angeles. Dept. of Chemistry and Biochemistry.
HIGH PRESSURE COSMOCHEMISTRY APPLIED TO MAJOR PLANETARY INTERIORS: EXPERIMENTAL STUDIES Status Report
Malcolm F. Nicol, Mary Johnson, and Andrea Schwake 1 Nov. 1983 7 p refs
(Grant NAGw-104)
(NASA-CR-173278; NAS 1.26:173278) Avail: NTIS HC A02/MF A01 CSCL 03B

Progress is reported in the development of the P-T-X diagram for $0 < \text{or} = X < \text{or} = 0.50$ and in the development of techniques for measuring adiabats of phases of NH3-H2O. The partial phase diagram is presented, investigations of the compositions of ammonia ices are described, and methods for obtaining the infrared spectra of ices are discussed. A.R.H.

N84-18139*# Lincoln Lab., Mass. Inst. of Tech., Lexington.
A SEARCH FOR EARTH-CROSSING ASTEROIDS Semiannual Status Report, 1 Jul. - 31 Dec. 1983
L. G. Taff and D. F. Kostishack 31 Dec. 1983 12 p refs
(Grant NAGw-232)
(NASA-CR-175374; NAS 1.26:175374) Avail: NTIS HC A02/MF A01 CSCL 03B

Improvements made in both resolution element size and sensitivity in EBSICON cameras are discussed. An up-to-date illustration of what an asteroid detection now looks like is provided. Shown are four phases during the realignment of the live (white) and reference (black) frames. As one passes through the sequence the stars' images overlap and become grey, while the displaced images of the asteroid do not cancel. Author

N84-17273# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
SHOT NOISE GENERATED BY GAS IMPACT DURING A COMETARY FLY-BY
Rejean Grard *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 151-159 refs (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

N84-17274# Parker (Lee W.), Inc., Concord, Mass.
A MODEL OF ELECTROSTATIC CHARGING AND SHEATH STRUCTURE OF GIOTTO NEAR HALLEY'S COMET
Lee W. Parker *In* ESA Spacecraft/Plasma Interactions and their Influence on Field and Particle Meas. Nov. 1983 p 161-166 refs Sponsored by ESA (For primary document see N84-17253 08-18)
Avail: NTIS HC A10/MF A01

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N84-18140 California Inst. of Tech., Pasadena.
THE ISOTOPIC COMPOSITION OF ENERGETIC PARTICLES EMITTED FROM A LARGE SOLAR FLARE Ph.D. Thesis
John David Spalding 1983 203 p
Avail: Univ. Microfilms Order No. DA8315735

Isotope abundance ratios for 5-50 MeV/nuc nuclei from a large solar flare that occurred on September 23, 1978 are reported. Finite values for the isotope abundance ratios C-13/C-12, N-15/N-14, O-18/O-16, Ne-22/Ne-20, Mg-25/Mg-24, and Mg-26/Mg-24 and upper limits for the isotope abundance ratios He-3/He-4, C-14/C-12, O-17/O-16, and Ne-21/Ne-20. Element abundances and spectra were measured to compare this particular flare with other flares reported in the literature. For measured isotope abundance ratios agree with the solar system abundance ratios of Cameron (1981). The Ne-22/Ne-20 value differs with confidence 97.5% from the abundance measured in the solar wind by Geiss, et al. (1972). Separate arguments appear to rule out simple mass fractionation in the solar wind and in solar energetic particle measurements as the cause of the discrepancy in the comparison of the apparent compositions of these two sources of solar material. Dissert. Abstr.

N84-18141*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EVIDENCE LINKING CORONAL MASS EJECTIONS WITH INTERPLANETARY MAGNETIC CLOUDS
Robert M. Wilson and Ernest Hildner Dec. 1983 25 p refs
(NASA-TM-82564; NAS 1.15:82564) Avail: NTIS HC A02/MF A01 CSCL 03B

Using proxy data for the occurrence of those mass ejections from the solar corona which are directed earthward, we investigate the association between the post-1970 interplanetary magnetic clouds of Klein and Burlaga and coronal mass ejections. The evidence linking magnetic clouds following shocks with coronal

mass ejections is striking; six of nine clouds observed at Earth were preceded an appropriate time earlier by meter-wave type II radio bursts indicative of coronal shock waves and coronal mass ejections occurring near central meridian. During the selected periods when no clouds were detected near Earth, the only type II bursts reported were associated with solar activity near the limbs. Where the proxy solar data to be sought are not so clearly suggested, that is, for clouds preceding interaction regions and clouds within cold magnetic enhancements, the evidence linking the clouds and coronal mass ejections is not as clear; proxy data usually suggest many candidate mass-ejection events for each cloud. Overall, the data are consistent with and support the hypothesis suggested by Klein and Burlaga that magnetic clouds observed with spacecraft at 1 AU are manifestations of solar coronal mass ejection transients. Author

N84-18142*# Stanford Univ., Calif. Center for Space Science and Astrophysics.
THE INTERPRETATION OF HARD X-RAY POLARIZATION MEASUREMENTS IN SOLAR FLARES
John Leach, A. Gordon Emslie (Alabama Univ., Huntsville), and Vahe Petrosian [1983] 13 p refs
(Grants NsG-7092; NAGw-294; NSF ATM-82-18125; NSF ATM-83-03172)
(NASA-CR-172790; NAS 1.26:172790) Avail: NTIS HC A02/MF A01 CSCL 03B

Observations of polarization of moderately hard X-rays in solar flares are reviewed and compared with the predictions of recent detailed modeling of hard X-ray bremsstrahlung production by non-thermal electrons. The recent advances in the complexity of the modeling lead to substantially lower predicted polarizations than in earlier models and more fully highlight how various parameters play a role in determining the polarization of the radiation field. The new predicted polarizations are comparable to those predicted by thermal modeling of solar flare hard X-ray production, and both are in agreement with the observations. In the light of these results, new polarization observations with current generation instruments are proposed which could be used to discriminate between non-thermal and thermal models of hard X-ray production in solar flares. M.G.

N84-18143# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
STABILITY OF THE LOW DEGREE 5 MINUTE SOLAR OSCILLATIONS
Russell B. Kidman and Arthur N. Cox 1983 10 p refs Presented at the Solar Seismology from Space Conf., Snowmass, Colo., 17-19 Sep. 1983
(Contract W-7405-eng-36)
(DE84-003786; LA-UR-83-3217; CONF-8308136-2) Avail: NTIS HC A02/MF A01

The decay rate for many of the low degree p-modes observed as 5 minute oscillations of the Sun are discussed. The theoretical results use the completely nonadiabatic linear theory of Saio and Cox (1980). The solar model is based on the evolution results of Christensen-Dalsbgaard (1982). Equation of state and opacity data come from the Los Alamos Opacity Library of Huebner, Merts, Magee, and Argo (1977). Rates for modes ranging from radial (1 = 0) to the nonradial ones with 1 = 5 for overtones 10 through 28. DOE

N84-18144# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo. Solar Terrestrial Physics Div.
SOLAR-GEOPHYSICAL DATA CENTER NUMBER 467, JULY 1983, PART 1 (PROMPT REPORTS). DATA FOR JUNE 1983, MAY 1983 AND LATE DATA
Helen E. Coffey, ed. and Joe H. Allen Jul. 1983 139 p
(PB84-100486; SGD-467-PT-1; NOAA-83092920) Avail: NTIS HC A07/MF A01 CSCL 03B

Tables of solar data are given. Alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, and solar magnetic field measurements are among the areas covered. GRA

N84-18145# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo. Solar Terrestrial Physics Div.
SOLAR-GEOPHYSICAL DATA NUMBER 467, JULY 1983, PART 2 (COMPREHENSIVE REPORTS). DATA FOR JANUARY 1983, NOVEMBER 1980 AND MISCELLANEA
Helen E. Coffey, ed. and Joe H. Allen Jul. 1983 97 p
(PB84-100494; SGD-467-PT-2; NOAA-83092921) Avail: NTIS HC A05/MF A01 CSCL 03B

Tables and graphs of solar data are given. Solar mass ejection, solar wind measurements, solar X-rays, solar flares, and solar radio emissions are among the areas covered. GRA

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N84-18146 Utah Univ., Salt Lake City.
THE COSMIC RAY ENERGY SPECTRUM FROM 2 X 10-17 TO 10-e-19 EV Ph.D. Thesis
Donald Robert Cady 1983 86 p
Avail: Univ. Microfilms Order No. DA8325639

The Fly's Eye detector, designed to detect the fluorescence and Cherenkov light emitted as cosmic ray air showers traverse the atmosphere, consists of 880 photomultiplier tubes arranged at the foci of 67 mirrors such that each phototube views a different part of the sky. Knowledge of the orientation of each phototube, and the times at which the pulses of light from the shower arrives at each phototube, allows reconstruction of the geometry of an air shower. Knowledge of the integral of the light pulse, along with knowledge of the shower trajectory, permits determination of the number of charged particles in the light emitting portion of the shower, giving the longitudinal development of the shower and therefore the energy of the primary cosmic ray that initiated the shower. The operation of the Fly's Eye is described as well as results of one experiment performed with it. Dissert. Abstr.

N84-18147*# Wisconsin Univ., Madison. Dept. of Physics.
LIMITS ON DIFFUSE X-RAY EMISSION FROM M101
D. McCammon and W. T. Sanders [1984] 31 p refs
(Grant NAG8-431)
(NASA-CR-173277; NAS 1.26:173277) Avail: NTIS HC A03/MF A01 CSCL 03B

Observed limits on diffuse X-ray emission from M101 require that the temperature of any coronal or matrix hot gas which is radiating an appreciable part (> 10%) of the average supernova power be less than 10(5.7)K. Furthermore, the fraction of the galactic plane occupied by hot buttles similar to the one which apparently surrounds the Sun is at most 25% in the region between 10 kpc and 20 kpc from the galactic center. M.G.

N84-18148*# California Univ., Berkeley. Space Sciences Lab.
HIGH RESOLUTION X- AND GAMMA-RAY SPECTROSCOPY OF COSMIC X-RAY SOURCES Final Report, 1 Feb. 1979 - 30 Apr. 1983
Robert P. Lin 1 Sep. 1983 22 p refs
(Grant NsG-7592)
(NASA-CR-175368; NAS 1.26:175368) Avail: NTIS HC A02/MF A01 CSCL 03B

A high resolution X-ray spectrometer and large area phoswich detector were designed and co-aligned in a common elevation mounting in order to measure solar and cosmic X-ray and gamma ray emission in the 13 to 600 KeV energy range from a balloon. The instrument is described and results obtained for the Crab Nebula, the supernova remnant Cas A, and the Sun are discussed and analyzed. A.R.H.

N84-18149*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

INTERPLANETARY FLOW SYSTEMS ASSOCIATED WITH COSMIC RAY MODULATION IN 1977 - 1980

L. F. Burlaga, F. B. McDonald, N. F. Ness, R. Schwenn (Max-Planck-Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany), A. J. Lazarus (MIT, Cambridge), and F. Mariani (Rome Univ.) Nov. 1983 33 p refs Submitted for publication

(NASA-TM-85120; NAS 1.15:85120) Avail: NTIS HC A03/MF A01 CSCL 03B

The hydromagnetic flow configurations associated with cosmic ray modulation in 1977 to 1980 were determined using solar wind plasma and magnetic field data from Voyagers 1 and 2 and Helios 1. The modulation was related to two types of large scale systems of flows: one containing a number of transients such as shocks, post shock flows and magnetic clouds; the other consisting primarily of a series of quasi-stationary flows following interaction regions containing a stream interface and often bounded by a forward reverse shock pair. Each of the three major episodes of cosmic ray modulation was characterized by the passage of the system of transient flows. Plateaus in the cosmic ray intensity time profile were associated with the passage of systems of corotating streams. M.G.

N84-18150*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

RAPPORTEUR PAPER FOR SESSIONS MG1, MG3 AND MG4: MODULATION THEORY, INTERPLANETARY PROPAGATION AND INTERPLANETARY ACCELERATION

Frank C. Jones Dec. 1983 12 p refs

(NASA-TM-86047; NAS 1.15:86047) Avail: NTIS HC A02/MF A01 CSCL 03B

Theories and reported results from investigations of cosmic ray modulation and acceleration are summarized. Aspects considered include microscopic or fundamental theory; gradient and curvature drifts in modulation; and interplanetary acceleration of shocks and particles. A.R.H.

N84-18151*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A STUDY OF THE DIFFUSE GALACTIC GAMMA RADIATION

C. E. Fichtel and D. A. Kniffen Jan. 1984 40 p refs Submitted for publication

(NASA-TM-86055; NAS 1.15:86055) Avail: NTIS HC A03/MF A01 CSCL 03B

The observed diffuse galactic gamma radiation is compared to that predicted from galactic cosmic ray interactions with galactic matter and photons, assuming that on a broad scale the galactic cosmic rays in the plane are correlated with matter density. Recent considerations of the galactic diffuse matter distribution, particularly the molecular hydrogen, the galactic photon density, and a revised cosmic ray galactic scale height, are included. The predictions are compared to the observational gamma ray longitude distributions, the latitude distribution, and energy spectrum, including the COS-B satellite results, and the COS-B background estimate. Considering the uncertainties, the agreement between the theoretical predictions and the gamma ray data seems generally reasonable, suggesting that the general concepts are likely to be correct. Both the results determined here alone and in conjunction with other work calculating source functions assuming only cosmic ray matter contributions indicate no necessity for a significant point source contribution to the diffuse gamma radiation in the energy range being considered (E(gamma)>10 MeV). M.G.

99 GENERAL

N84-18152*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

RESEARCH AND TECHNOLOGY REPORT, 1983 Annual Report

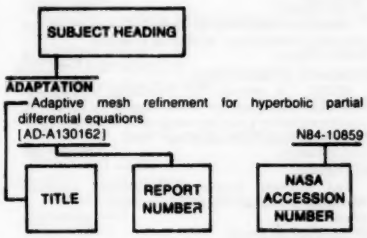
Nov. 1983 85 p refs

(NASA-TM-85865; A-9560; NAS 1.15:85865) Avail: NTIS HC A05/MF A01 CSCL 05B

Highlights are presented of activities at Ames North and Ames Dryden in the areas of aeronautics, life science, and space science and applications. A.R.H.

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

ABLATIVE MATERIALS
An investigation of the thermodegradation of ablative organic silicon resin
[AD-A135546] N84-17397
ABSORPTION SPECTRA
Theoretical studies of solar-pumped lasers
[NASA-CR-173283] N84-17576
The retrieval of atmospheric constituent mixing-ratio profiles from solar absorption spectra
[NASA-CR-173303] N84-17730
Effects of systematic errors on the mixing ratios of trace gases obtained from occulation spectra
[NASA-CR-175371] N84-18046
ABSORPTION SPECTROSCOPY
Manual of analytical methods for radiobioassay
[DE84-003978] N84-17318
Combustion gas spectroscopy using tunable lasers
[DE84-004976] N84-17320
ABUNDANCE
Detection of elements in biomedical fluids by laser-induced breakdown spectroscopy
[DE84-003838] N84-17319
The isotopic composition of energetic particles emitted from a large solar flare N84-18140
ACCELERATED LIFE TESTS
Ceramic life prediction methodology - hot spin disc life program
[AD-A134783] N84-17400
ACCELERATION (PHYSICS)
Optimal electric drive control to suppress jerking
[BLL-M-35391-(5828.4)] N84-17589
Blood flow measurements under high-G conditions: Early prediction of Gz tolerance
[AD-A134653] N84-17823
ACCELERATION TOLERANCE
Mathematical simulation of the cardiopulmonary system
[AD-A135460] N84-17822
ACCELEROMETERS
A detailed evaluation of the Endevco model 7302 (trade name) angular accelerometer
[AD-A134882] N84-17562
ACCEPTABILITY
Spas color camera
[NASA-CR-171739] N84-17559
Automated acceptance test procedures for wideband microwave synthesized signal generator testing
[AD-A134923] N84-17563
ACCIDENT INVESTIGATION
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134834] N84-17155
ACCIDENT PREVENTION
Crashworthy cyclic control stick
[AD-A135150] N84-17176
Electrical-shock prevention. Volume 1: Protection of maintenance personnel
[PB84-102946] N84-17865
Electrical-shock prevention. Volume 2: Ground-fault interrupting devices
[PB84-102953] N84-17866
Electrical-shock prevention. Volume 3: Fault protection for motion-drive equipment
[PB84-102961] N84-17867
Electrical-shock prevention. Volume 4: Overhead-line contact fatalities
[PB84-102979] N84-17868
Analysis of electrical accident prevention countermeasures
[PB84-102987] N84-17869
ACCRETION DISKS
The physical nature of the continuum in active galaxies N84-18128
ACCUMULATORS (COMPUTERS)
Hierarchical cache accumulators for sequential mode estimation
[AD-A134698] N84-17908
ACCURACY
Spectral methods for the Euler equations: Chebyshev methods and shock-fitting
[NASA-CR-172295] N84-17118
Manual of analytical methods for radiobioassay
[DE84-003978] N84-17318
Dressing methods for grinding wheels made of superhard abrasive materials
[CSIR-TRANS-1700] N84-17419
Pertinent meteorological data for hurricane Allen of 1980
[PB84-104322] N84-17766
Measurement of robot accuracy using the Latin Square Three-Dimensional Ball Plate
[DE84-004920] N84-17862
Thermodynamics library for AFOS (Automation of Field Operations and Services) programmers (THERMO LB)
[PB84-122621] N84-17925
ACID RAIN
Atmospheric deposition to forests
[DE84-003384] N84-17700
Estimation of North America anthropogenic sulfur deposition as a function of source/receptor separation
[DE84-003638] N84-17701
ACIDS
Formation and remodeling of the early wound matrix
[AD-A134576] N84-17833
ACOUSTIC ATTENUATION
Preliminary investigation of an electrical network model for ultrasonic scattering
[NASA-CR-3770] N84-17606
ACOUSTIC EMISSION
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 1
[AD-A135387] N84-17626
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 2
[AD-A135388] N84-17627
Introduction to acoustic emission
[NASA-TM-77088] N84-18016
Acoustic imaging of vapor bubbles through optically non-transparent media
[DE84-003961] N84-18022
ACOUSTIC MICROSCOPES
Acoustic microscopy at cryogenic temperatures
[AD-A135089] N84-17421
ACOUSTIC PROPAGATION
Reduction of propeller noise by a reflecting rubber layer --- ship propellers
[FOA-C-20506-E4] N84-18025
ACOUSTIC SOUNDING
Acoustic data and uncertainty in geotechnical site characterization offshore
[PB84-100908] N84-17801
ACOUSTIC VELOCITY
Acoustic data and uncertainty in geotechnical site characterization offshore
[PB84-100908] N84-17801
ACTIVE CONTROL
Active control of the potential of ISEE-1 by an electron gun N84-17278
ACTIVITY (BIOLOGY)
Changes in the T and B systems of immunity in seamen during a long cruise N84-17819
ACTUATORS
Selection of noisy sensors and actuators for regulation of linear systems --- large space structures
[AD-A135442] N84-17931
ADA (PROGRAMMING LANGUAGE)
Feasibility assessment of JOVIAL to Ada translation
[AD-A134857] N84-17911
ADAPTIVE CONTROL
An on-line equivalent system identification scheme for adaptive control
[NASA-TM-85737] N84-17185
Adaptive feedforward linear wideband HF power bank
[AD-A134744] N84-17493
ADAPTIVE FILTERS
Investigation of design considerations for a complex demodulation filter
[NASA-CR-173295] N84-17195
Intrinsic adaptive mesh techniques
[NASA-CR-175375] N84-17941
ADDITIVES
Consolidation of Si3N4 without additives (by hot isostatic pressing)
[NASA-CR-173279] N84-17389
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reaction flows
[NASA-CR-175365] N84-17520
ADHESION TESTS
Adhesion studies on ion plated TiN steel
[BLL-RISLEY-TR-4880-(9091.9F)] N84-17341
ADHESIVES
Development or a solar cell coverglass adhesive for space application
[BMFT-FB-W-83-029] N84-17695
ADSORPTION
Atomic hydrogen maser investigations of hydrogen atom interactions from 4 K to 12 K
[AD-A134917] N84-17582
AERIAL PHOTOGRAPHY
Evaluation of published criteria for identifying metamorphic rocks on air photos: Two case studies in the northeastern United States
[AD-A135451] N84-17672
AERIAL RECONNAISSANCE
Design of a remotely controlled hovercraft vehicle for spill reconnaissance
[PB84-124064] N84-17187
AERODYNAMIC CHARACTERISTICS
The COREL and W12SC3 computer programs for supersonic wing design and analysis
[NASA-CR-3676] N84-17130
Aerodynamic characteristics of a Sparrow 3 missile model in the flow field of a generalized parent body at Mach 2.86
[NASA-TM-85713] N84-17134
Mathematical modeling of the aerodynamic characteristics in flight dynamics
[NASA-TM-85880] N84-17141
Air Force Academy Aeronautics Digest - Fall/Winter 1982
[AD-A135073] N84-17145

The 2-dimensional inextensible lifting membrane airfoil, theory and experiment
[AD-A135251] N84-17147
Rotary wing aircraft and technical publications of NASA, 1970 - 1982
[NASA-TM-85521] N84-18102

AERODYNAMIC COEFFICIENTS
A recontoured, upper surface designed to increase the maximum lift coefficient of a modified NACA 65 (0.82) (9.9) airfoil section
[NASA-TM-85855] N84-17144

AERODYNAMIC CONFIGURATIONS
A study of prediction methods for the high angle-of-attack aerodynamics of straight wings and fighter aircraft
[NASA-CR-3764] N84-17131
Airloads research study. Volume 2: Airload coefficients derived from wind tunnel data
[NASA-CR-10410] N84-17174
STEP mechanical systems N84-17213

AERODYNAMIC FORCES
Aeroelastic analysis using nonlinear aerodynamic methods
[AD-A135133] N84-17146
The question of optimization of three-dimensional maneuver of orbital apparatus in the atmosphere
[AD-A134753] N84-17280

AERODYNAMIC INTERFERENCE
Calculation of the aerodynamic flow field in the vicinity of a Sea King helicopter
[ARL-AERO-REPT-158] N84-17128
TWINTN4: A program for transonic four-wall interference assessment in two-dimensional wind tunnels
[NASA-CR-3777] N84-17189

AERODYNAMIC LOADS
Helicopter rotor wake geometry and its influence in forward flight. Volume 1: Generalized wake geometry and wake effect on rotor airloads and performance
[NASA-CR-3726] N84-17149
In-flight load testing of advanced shuttle thermal protection systems
[NASA-TM-86024] N84-17250
Studies and vorticity effects by the Euler equations with emphasis on supersonic flow fields
[AD-A135118] N84-17535

AERODYNAMIC NOISE
Correlations of supersonic boundary-layer transition on cones including effects of large axial variations in wind-tunnel noise
[NASA-TP-2229] N84-17534
Experimental blade vortex interaction noise characteristics of a utility helicopter at 1/4 scale
[NASA-TM-84653] N84-18018

AERODYNAMIC STALLING
Air Force Academy Aeronautics Digest - Fall/Winter 1982
[AD-A135073] N84-17145

AERODYNAMICS
Aeronautical engineering. A continuing bibliography with indexes, supplement 169, January 1984
[NASA-SP-7037(169)] N84-17117
STEP mechanical systems N84-17213
Shuttle on-orbit dynamics N84-17216

AEROELASTICITY
Loads and aeroelasticity division research and technology accomplishments for FY 1983 and plans for FY 1984
[NASA-TM-85740] N84-17135
Aeroelastic analysis using nonlinear aerodynamic methods
[AD-A135133] N84-17146
Airloads research study. Volume 1: Flight test loads acquisition
[NASA-CR-170409] N84-17173

AERONAUTICAL ENGINEERING
Aeronautical engineering. A continuing bibliography with indexes, supplement 169, January 1984
[NASA-SP-7037(169)] N84-17117
The Prandtl Hergesell project of a National Research Establishment for Aeronautics
[DFVLR-MITT-83-10] N84-17123

AERONAUTICS
Research and technology report, 1983
[NASA-TM-85865] N84-18152

AERONOMY
Research in aeronomy
[NASA-CR-175370] N84-17721

AEROSOLS
Light scattering condensation nuclei, and air mass trajectories at Whiteface Mountain: Summer 1982
[PB84-104363] N84-17742
Satellite measurements of atmospheric aerosols
[AD-A135241] N84-17757
Sea salt aerosol, atmospheric radon and meteorological observations in the western South Atlantic Ocean (February 1981)
[AD-A134792] N84-17794

AEROSPACE ENVIRONMENTS
Space Technology Experiments Platform (STEP) overview N84-17212
The effects of the space environment on damping materials and damping designs on flexible structures N84-17217

AEROSPACE MEDICINE
Military Medical Journal, no. 7, 1983
[L-2456] N84-17811
Prevention of flight fatigue by physical training N84-17812
Military Medical Journal, no. 2, 1983
[L-2341] N84-17814
Military Medical Journal, no. 3, 1983
[L-2399] N84-17817

AEROSPACE SCIENCES
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
Space Technology Experiments Platform (STEP) overview N84-17212
STEP electronic system design N84-17214
Research and technology report, 1983
[NASA-TM-85865] N84-18152

AEROSPACE SYSTEMS
Identification of bottlenecks and capacity constraints in F-14, F-15, F-16, and F/A-18 aircraft production
[AD-A134629] N84-17121
Control strategies for complex systems for use in aerospace avionics
[AD-A135072] N84-17179

AEROSPACE TECHNOLOGY TRANSFER
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
STEP electronic system design N84-17214
STEP experiment integration N84-17215
Deployable beam flight experiment (MAST) N84-17218

AEROTHERMODYNAMICS
Assessment of real gas effects on the prediction of the aerodynamics of high velocity Army shells
[AD-A134739] N84-17150

AGING (METALLURGY)
Effect of specimen size and nickel content on the impact properties of 12 Cr-1 MoVW ferritic steel
[DE84-003270] N84-17377
Aging degradation of cast stainless steel: Status and program
[DE84-004018] N84-17381
Over-aging of aluminum alloys
[DE84-004927] N84-17382

AGRICULTURE
Remote sensing: New satellite systems and potential applications --- conferences
[ESA-SP-205] N84-17650
Remote sensing for agriculture and land use N84-17666

AH-1G HELICOPTER
Human factors issues associated with the use of speech technology in the cockpit
[NASA-CR-166548] N84-17433

AIR
Integrated aircraft fuel tank inerting and compartment fire suppression system. Volume 2: Evaluation of nitrogen-enriched air as a fire suppressant
[AD-A134883] N84-17157

AIR COOLING
Characteristics of a four nozzle, slotted mixing stack with slanted shroud, gas eductor system
[AD-A134794] N84-17547

AIR CURRENTS
Experimental water tunnel with density stratification for the simulation of small-scale atmospheric flows
[BLL-RISLEY-TR-4871-(9091.9F)] N84-17188

AIR NAVIGATION
Satellite-directed navigational guidance for aircraft
[H-REPT-98-510] N84-17164

AIR PIRACY
Semiannual report to Congress on the effectiveness of the civil aviation security program
[AD-A134860] N84-17156

AIR POLLUTION
Evaluation of wind field interpolation schemes used in studies of regional-scale pollutant transport
[DE84-003634] N84-17699
Dispersion experiments with sulfur hexafluoride from the 213m high meteorological mast at Cabauw in the Netherlands N84-17706
Environmental Radiation Data Report 33, January - March 1983
[PB84-104785] N84-17708
Air pollution effects on terrestrial ecosystems
[PB84-128313] N84-17712
Human exposure to atmospheric concentrations to selected chemicals, volume 1
[PB84-102540] N84-17835

AIR PURIFICATION
Advanced air revitalization system testing
[NASA-CR-166540] N84-17855

AIR QUALITY
Review of the National Ambient Air Quality Standards for sulfur oxides: Assessment of scientific and technical information
[PB84-102920] N84-17711
Preparing meteorological data for use in routine dispersion calculations: Workgroup summary
[PB84-119890] N84-17774

AIR SEA ICE INTERACTIONS
MIZEX: A program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 2: A science plan for a summer marginal ice zone experiment in the Fram Strait/Greenland sea: 1984
[AD-A134872] N84-17737

AIR TRAFFIC
FAA (Federal Aviation Administration) statistical handbook of aviation: Calender year 1982
[PB84-127323] N84-17124

AIR TRANSPORTATION
Effects on rail transport caused by air transport supply alternatives within the Federal Republic of Germany for the year 2000
[DFVLR-MITT-83-14] N84-17160

AIR WATER INTERACTIONS
Chemical and biological processes in CO/sub 2-ocean models
[DE84-003304] N84-17702
Ocean research for understanding climatic variations: Priorities and goals for the 1980's
[PB84-105816] N84-17768

AIRBORNE EQUIPMENT
Airborne fallout monitoring
[FOA-A-40045-A3] N84-17705
Inorganic analysis in a controlled ecological life support system
[NASA-CR-173299] N84-17852

AIRCRAFT ACCIDENTS
FAA (Federal Aviation Administration) statistical handbook of aviation: Calender year 1982
[PB84-127323] N84-17124
The 1980 and 1981 accident experience of civil airmen with selected visual pathology
[AD-A134898] N84-17158
Computer modeling of aircraft cabin fires
[PB84-101153] N84-17162

AIRCRAFT COMPARTMENTS
Developments in cabin safety and crashworthiness --- passenger aircraft N84-17161

AIRCRAFT CONFIGURATIONS
Research and technology report, 1983
[NASA-TM-85865] N84-18152

AIRCRAFT CONSTRUCTION MATERIALS
Friction and wear behavior of aluminum and composite airplane skins
[NASA-TP-2262] N84-17175
Composite structural materials
[NASA-CR-173259] N84-17293

AIRCRAFT DESIGN
Wave drag as the objective function in transonic fighter wing optimization
[NASA-TP-2265] N84-17127
Loads and aeroelasticity division research and technology accomplishments for FY 1983 and plans for FY 1984
[NASA-TM-85740] N84-17135
Trailing edge flow conditions as a factor in airfoil design
[NASA-CR-173294] N84-17140
Developments in cabin safety and crashworthiness --- passenger aircraft N84-17161

AIRCRAFT DETECTION
Preliminary field tests for detecting flying targets in front of a land background --- ground observers
[FOA-C-56033-H2] N84-17847
Detection of flying targets in front of a land background: Laboratory tests
[FOA-C-56034-H2] N84-17848
Detection of flying targets in front of a land background: Field tests --- human observers
[FOA-C-56035-H2] N84-17849

AIRCRAFT FUELS
Alternative fuels for general aviation
[GPO-27-618] N84-17409
Emission FTIR analyses of thin microscopic patches of jet fuel residue deposited on heated metal surface
[NASA-CR-168331] N84-17410

AIRCRAFT GUIDANCE
A comparison of two position estimate algorithms that use ILS localizer and DME information. Simulation and flight test results
[NASA-TP-2281] N84-17165
AIRCRAFT HAZARDS
Integrated aircraft fuel tank inerting and compartment fire suppression system. Volume 2: Evaluation of nitrogen-enriched air as a fire suppressant
[AD-A134883] N84-17157
Status for knowledge: Meteorological affected icing on aircraft in clouds
[DFVLR-MITT-83-12] N84-17763
AIRCRAFT INSTRUMENTS
CDTI target selection criteria
[NASA-CR-3776] N84-17178
AIRCRAFT LANDING
Results of a slant range visibility field test in Munich-Reim
[DFVLR-MITT-83-09] N84-17169
AIRCRAFT MAINTENANCE
Development of a stable epoxy resin system for composite repair
[AD-A135390] N84-17395
AIRCRAFT MANEUVERS
Wave drag as the objective function in transonic fighter wing optimization
[NASA-TP-2265] N84-17127
AIRCRAFT NOISE
La Recherche Aerospatiale bimonthly bulletin, number 1983-3, 214/May-June
[ESA-TT-822] N84-18014
AIRCRAFT PILOTS
Mathematical simulation of the cardiopulmonary system
[AD-A135460] N84-17822
AIRCRAFT SAFETY
Airport and aircraft safety research and technology
[GPO-26-497] N84-17152
Explosion and fire hazards in an oil-oxygen system — of an airplane
[FOA-C-20507-D1] N84-17159
Developments in cabin safety and crashworthiness — passenger aircraft N84-17161
AIRCRAFT STABILITY
Bifurcation analysis of aircraft pitching motions near the stability boundary
[NASA-TM-85881] N84-17137
AIRFOILS
Tests on a CAST 7 two-dimensional airfoil in a streamlining test section
[NASA-CR-172291] N84-17136
Trailing edge flow conditions as a factor in airfoil design
[NASA-CR-173294] N84-17140
A recontoured, upper surface designed to increase the maximum lift coefficient of a modified NACA 65 (0.82) (9.9) airfoil section
[NASA-TM-85855] N84-17144
The 2-dimensional inextensible lifting membrane airfoil, theory and experiment
[AD-A135251] N84-17147
IRAAM wind tunnel test, task 3
[AD-A135256] N84-17148
A cooperative program to stimulate student involvement through the MIT Undergraduate Research Opportunity Program
[NASA-CR-173300] N84-18086
Calculating C-grids with fine and embedded mesh regions
[CFDL-TR-83-7] N84-18090
AIRFRAMES
Estimating the cost of composite material airframes using the Rand Corporation Development and Procurement Costs of Aircraft parametric model (DAPCA III)
[AD-A134993] N84-17120
Use of small crack data to bring about and quantify improvements to aircraft structural integrity
[AD-A135012] N84-17623
AIRGLOW
Optical, radio and computer simulation studies of the Brazil ionospheric modification experiment of 8 September 1982
[AD-A135143] N84-17731
Dual channel water vapor radiometer system
[PB84-119445] N84-17746
AIRPORT SECURITY
Semiannual report to Congress on the effectiveness of the civil aviation security program
[AD-A134860] N84-17156
AIRPORTS
Airport and aircraft safety research and technology
[GPO-26-497] N84-17152
ALASKA
Probable maximum precipitation and snowmelt criteria for southeast Alaska
[PB84-104371] N84-17777
ALBEDO
Determination of the planetary radiation budget from TIROS-N satellites
[PB84-100916] N84-17748
ALGEBRA
An algebraic approach to analysis and control of time-scales
[AD-A135115] N84-17949
Diophantine equations N84-18004
ALGORITHMS
A comparison of two position estimate algorithms that use ILS localizer and DME information. Simulation and flight test results
[NASA-TP-2281] N84-17165
Breadboard stellar tracker system test report
[NASA-CR-170973] N84-17166
Study on optimal tracking strategy — satellite tracking
[GMV-211/83] N84-17243
Coding of full motion color video signals at 50 kb/s
[AD-A134319] N84-17456
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1
[AD-A135232] N84-17485
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2
[AD-A135233] N84-17486
Testability of interconnection structures
[AD-A135431] N84-17607
Design and complexity of VLSI algorithms N84-17876
On acyclic database decompositions
[AD-A135105] N84-17887
Modelling algorithm execution time on processor arrays
[NASA-CR-172289] N84-17899
Computer networks without a shared memory AFOSR-81-0197
[AD-A135074] N84-17927
Estimation techniques for transport equations
[AD-A135092] N84-17945
Spline-based estimation techniques for parameters in elliptic distributed systems
[NASA-TM-85439] N84-17947
Algorithms, modeling and estimation for linear systems
[AD-A135134] N84-17951
Matrix-free methods in the solution of stiff systems of ODE's
[DE84-003361] N84-17974
Statistical data processing, system modeling and reliability
[AD-A135208] N84-17984
Factorization algorithms of exponential order N84-17994
Analysis and comparison of some integer factoring algorithms N84-17995
Quadratic fields and factorization N84-18002
Multi-dimensional continued fraction algorithms N84-18003
The program complexity of searching a table
[AD-A135299] N84-18104
Distributed algorithms for various problems
[AD-A135452] N84-18105
ALKALI METALS
Fourier transform and polychromator studies of the inductively coupled plasma
[DE84-003975] N84-18059
ALKALIES
Chemical and electrochemical properties in molten alkaline hydroxides. 3: Oxide and acid complexes of some metallic cations
[BLL-RISLEY-TR-4858-(9091.9F)] N84-17299
ALKANES
Time-temperature studies of high temperature deterioration phenomena in lubricant systems: Synthetic ester lubricants
[AD-A135464] N84-17594
ALLUVIUM
Geophysical exploration surveys for ground water in the San Pedro Basin, Arizona
[PB84-110808] N84-17684
ALPHA PARTICLES
Ion beam modification of ceramics
[DE84-003302] N84-17403
ALTERNATING CURRENT
AC voltage calibrations for the 0.1 Hz to 10 Hz frequency range
[PB84-109867] N84-17570
ALUMINUM
An experimental and numerical investigation of pressure-shear waves in 6061-T6 aluminum and alpha-titanium N84-17345
A technique for the nondestructive detection of voids and composition anomalies in metal matrix composite wires using X or gamma rays
[AD-A135481] N84-17359
An evaluation of overload retardation behavior and overload retardation models of Ti-6Al-4V sheet titanium alloy
[AD-A135548] N84-17362
Eddy current thickness gauge for reel-to-reel tape processes
[DE84-004050] N84-17567
Rabbit neurobehavioral toxicity from aluminum
[PB84-103266] N84-17609
ALUMINUM ALLOYS
Friction and wear behavior of aluminum and composite airplane skins
[NASA-TP-2262] N84-17175
Study of intermetallic compounds in ternary systems Al-Ba-Nd and Al-Ba-Yb
[BLL-M-35387-(5828.4)] N84-17343
Microstructural and mechanical aspects of fatigue crack initiation and growth in a 2048 aluminum alloy N84-17347
Aluminum-manganese plating from a molten salt bath
[AD-A135240] N84-17356
Precipitation mechanisms in aluminum-lithium alloys
[AD-A134836] N84-17367
Segregation of Zn solutes to high-angles (001) twist grain boundaries in Al
[DE84-003455] N84-17375
Over-aging of aluminum alloys
[DE84-004927] N84-17382
Fundamental mathematical principles for electrochemical engineering
[DE84-002181] N84-17975
ALUMINUM CHLORIDES
Process and cell arrangement for producing difficult to reduce elements by fused salt electrolysis
[BLL-OA-TRANS-3137-(6196.3)] N84-17339
ALUMINUM OXIDES
Electrode noise in beta aluminas
[AD-A134837] N84-17497
AMBIENCE
Observations of the GEOS-2 equilibrium potential and its relation to the ambient electron energy distribution N84-17256
AMMONIA
Equation of state of fluid NH-3 from P-V-T and ultrasound measurements to 12 kbar
[DE83-015913] N84-17316
High pressure cosmochemistry applied to major planetary interiors: Experimental studies — phase diagram for the ammonia water system
[NASA-CR-173278] N84-18138
AMMONIUM CHLORIDES
Chloride ion conductivity in a plasticized quaternary ammonium polymer
[AD-A135373] N84-17305
AMMONIUM PERCHLORATES
Expanded ignition effectiveness tests of selected igniter materials with Navy propellants
[AD-A134704] N84-17312
AMPLIFIER DESIGN
The 20 GHz spacecraft FET solid state transmitter
[NASA-CR-168240] N84-17477
Radially resolved simulation of a high-gain free electron laser amplifier
[DE84-003751] N84-17585
AMPLIFIERS
Adaptive feedforward linear wideband HF power bank
[AD-A134744] N84-17493
AMPLITUDES
Atmospheric scintillation at 94 GHz
[AD-A134743] N84-17452
Amplitude Compandored Sideband compared to conventional frequency modulation for VHF mobile radio: Laboratory and field testing results
[PB84-116383] N84-17474
ANALOG CIRCUITS
Acquisition systems for heat transfer measurement
[DE84-003779] N84-17551
INTAC: Digital and analog circuit test language
[INPE-2764-PRE/338] N84-17898
ANALOG TO DIGITAL CONVERTERS
Simply instrumentable and optimal digitization of analog information sources
[AD-A135124] N84-17484
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1
[AD-A135232] N84-17485

Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2
[AD-A135233] N84-17486
Acquisition systems for heat transfer measurement
[DE84-003779] N84-17551

ANALOGS
Water immersion and its computer simulation as analogs of weightlessness
[NASA-CR-171746] N84-17821

ANALYSIS (MATHEMATICS)
Bifurcation and stability theory with application to problems of combustion and flame propagation
[AD-A135383] N84-17306
The computation of Galois groups N84-18000

ANALYTIC GEOMETRY
Diophantine equations N84-18004

ANGLE OF ATTACK
Prediction of vortex shedding from circular and noncircular bodies in supersonic flow
[NASA-CR-3754] N84-17129
A study of prediction methods for the high angle-of-attack aerodynamics of straight wings and fighter aircraft
[NASA-CR-3764] N84-17131
Bifurcation analysis of aircraft pitching motions near the stability boundary
[NASA-TM-85881] N84-17137
Wind-tunnel free-flight investigation of a model of a forward-swept-wing fighter configuration
[NASA-TP-2230] N84-17184

ANNUAL VARIATIONS
A statistical-dynamical study of the large-scale intraseasonal variability of the northern hemisphere winter circulation N84-17716

ANNULAR FLOW
Air Force Academy Aeronautics Digest - Fall/Winter 1982
[AD-A135073] N84-17145

ANOMALIES
Anomalously high potentials observed on ISEE
[NASA-CR-172791] N84-17252
Anomalous behavior of ISEE-1 detected by the electron density experiment N84-17259
Atmospheric planetary-wave response to external forcing
[NASA-CR-175165] N84-17726
Maximum entropy reconstruction of a volume anomaly from pulse scatter data
[DE84-002463] N84-18084

ANTARCTIC REGIONS
Reports of the U.S. - U.S.S.R. Weddell Polynya expedition, October-November 1981. Volume 6: Upper-air data
[AD-A134871] N84-17736

ANTENNA ARRAYS
Multifrequency synthetic aperture radar antenna comparison study — for remote sensing
[NASA-CR-171736] N84-17434
Cylindrical microstrip array: C-band beacon antenna array with 48 rectangular radiating elements fed in-phase
[AD-A135144] N84-17442
Studies in fin-line antenna design for phased array applications
[AD-A135255] N84-17444
Handbook for broadband isotropic antenna system. Volume 1: Operation manual
[PB84-101948] N84-17510

ANTENNA DESIGN
SAPIENS MEMO 5: The mechanical design of the EMP-simulator SAPIENS
[FOA-C-30320-A3] N84-17192
Study on large, ultralight long-life structures in space, phase 2C
[TM-EKR3] N84-17284
Multifrequency synthetic aperture radar antenna comparison study — for remote sensing
[NASA-CR-171736] N84-17434
Studies in fin-line antenna design for phased array applications
[AD-A135255] N84-17444
A program for computer-controlled impedance measurement within the microwave range — antennas
[FOA-C-30330-E3] N84-17460

ANTENNA RADIATION PATTERNS
Airborne antenna pattern calculations
[NASA-CR-173284] N84-17436
Cylindrical microstrip array: C-band beacon antenna array with 48 rectangular radiating elements fed in-phase
[AD-A135144] N84-17442

ANTENNAS
A study of microwave and millimeter-wave quasi-optical planar mixers
[AD-A135252] N84-17443

ANTHROPOMETRY
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 1
[AD-A134833] N84-17154

ANTINEUTRINOS
Low energy neutrino physics
[DE84-002856] N84-18037

ANTIOXIDANTS
Time-temperature studies of high temperature deterioration phenomena in lubricant systems: Synthetic ester lubricants
[AD-A135464] N84-17594

APPLICATIONS OF MATHEMATICS
Derivations of a prime ring which satisfy a polynomial identity
[AD-A135435] N84-17963

APPROACH
A comparison of two position estimate algorithms that use ILS localizer and DME information. Simulation and flight test results
[NASA-TP-2281] N84-17165

APPROXIMATION
Photoemission spectroscopy and the optical properties of surface
[PB84-100445] N84-17331
Regular operator approximation theory
[HMI-B-389] N84-18008

ARC DISCHARGES
A review of SCATHA satellite results: Charging and discharging N84-17254

ARCHITECTURE (COMPUTERS)
VLSI research
[AD-A134628] N84-17491
EASAMS architecture for management and control systems N84-17871
Distributed computing N84-17874
Parallel computation N84-17875
Performance evaluation and control of distributed computer communication networks
[AD-A135121] N84-17928
Statistical data processing, system modeling and reliability
[AD-A135208] N84-17984
Luneburg lens and optical matrix algebra research
[NASA-TM-172276] N84-18047

ARCTIC OCEAN
Physical oceanography report STD data from drifting ice station Fram 1
[AD-A134244] N84-17797
Investigation of ice dynamics in the marginal ice zone — Arctic Ocean
[AD-A134599] N84-17799

ARCTIC REGIONS
Providing comprehensive national policy dealing with national needs and objectives in the Arctic and national materials policy
[H-REPT-98-593] N84-17640
Arctic personnel effects
[AD-A134892] N84-17829

AREA NAVIGATION
A comparison of two position estimate algorithms that use ILS localizer and DME information. Simulation and flight test results
[NASA-TP-2281] N84-17165

ARITHMETIC
Fast arithmetic operations on numbers and polynomials N84-17992

ARIZONA
Geophysical exploration surveys for ground water in the San Pedro Basin, Arizona
[PB84-110808] N84-17684
Subsidence monitoring for state of Arizona
[PB84-126960] N84-17750

ARM (ANATOMY)
Physiological responses to prolonged upper body exercise
[AD-A134811] N84-17826

ARMED FORCES (UNITED STATES)
Microfiche Image Transmission System (MITS) demonstration field evaluation of microfacsimile
[AD-A134716] N84-17450
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824

ARMOR
West breakwater-Sines (Portugal): Study of armor stability N84-17788
West breakwater-Sines (Portugal): New aspects of armor units N84-17789

AROMATIC COMPOUNDS
Model compound studies of rigid rod aromatic heterocyclic polymer systems, the X-ray crystal structure of 2,6-diphenylbenzo (1,2-d; 5,4-d') diimidazole tetrahydrate, C2OH14N4. 4H2O, a model system for the study of polymer-water interaction in polybenzimidazoles
[AD-A135278] N84-17393

AROUSAL
Cognition and arousal as predictors of risk taking: Effects of load and cognitive style
[AD-A134324] N84-17843
Task differences, stylistic characteristics and physiological arousal
[AD-A134335] N84-17844

ARRAYS
Modelling algorithm execution time on processor arrays
[NASA-CR-172289] N84-17899

ARTERIES
High capacity heat pipe performance demonstration
[NASA-CR-171733] N84-17531

ARTERIOSCLEROSIS
Investigation of the microcirculation of the conjunctiva in airmen with the initial symptoms of cerebral atherosclerosis N84-17818

ARTIFICIAL INTELLIGENCE
Reasoning in multiple belief spaces N84-17894
Knowledge representation and natural-language semantics
[AD-A135476] N84-17905
Inquiry semantics: A functional semantics of natural language grammar
[AD-A135153] N84-17929
Mutual adaptiveness of man and machine in information acquisition tasks
[AD-A135449] N84-17932

ARTIFICIAL SATELLITES
Satellite measurements of atmospheric aerosols
[AD-A135241] N84-17757

ASPHALT
Evaluation of Chem-Crete high strength modified asphalt concentrate
[PB84-105089] N84-17636

ASSEMBLIES
Dynamic behavior of nonuniform tire/wheel assemblies
[PB84-125541] N84-17598

ASSEMBLING
Pulsed heterodyne CO2 laser/scanner system. Volume 1: Assembly report
[AD-A135059] N84-17577

ASSURANCE
Management input in quality N84-17602
Design QA on a small batch project N84-17603
Measuring quality achievements N84-17605

ASTEROIDS
A search for Earth-crossing asteroids
[NASA-CR-175374] N84-18139

ASTRONAUTS
Mathematical simulation of the cardiopulmonary system
[AD-A135460] N84-17822

ASTRONOMICAL CATALOGS
First, second and third Herstmonceux catalogues of stars for 1950.0
[BULL-189] N84-18125
Narrow-band photometry of faint red stars, 2
[BULL-191] N84-18126

ASTRONOMY
Combined ultraviolet studies of astronomical sources
[NASA-CR-175377] N84-18121

ASYMMETRY
Preserving asymmetry by symmetric processes and distributed fair conflict resolution
[AD-A135458] N84-17986

ASYMPTOTES
Tests for preference
[MATH-CENTRE-TRACTS-162] N84-17939

ASYMPTOTIC METHODS
Asymptotic properties of extended Yule-Walker estimates of the AR parameters of an ARMA (autoregressive moving-average)
[AD-A134981] N84-17970

ATLANTIC OCEAN
Pertinent meteorological data for hurricane Allen of 1980
[PB84-104322] N84-17766
Methodology for the calculation of a shallow-water wave climate
[AD-A134715] N84-17792
Hydrographic station data of five surveys of the beta-triangle in the eastern North Atlantic, 1978 - 1981
[PB84-100874] N84-17800

ATMOSPHERIC ATTENUATION
Silent radar: A study of the performances of a navigational radar with limited range
[FOA-C-30334-E1] N84-17461

ATMOSPHERIC BOUNDARY LAYER
Effect of diabatic and frictional processes on frontal circulations
[PB84-104074] N84-17778

Sea salt aerosol, atmospheric radon and meteorological observations in the western South Atlantic Ocean (February 1981)
[AD-A134792] N84-17794

ATMOSPHERIC CIRCULATION
A statistical-dynamical study of the large-scale intraseasonal variability of the northern hemisphere winter circulation: N84-17716
Atmospheric planetary-wave response to external forcing
[NASA-CR-175165] N84-17726
A climatically-derived global soil moisture data set for use in the GLAS atmospheric circulation model seasonal cycle experiment
[NASA-CR-173289] N84-17729
Kinetic energy in the northern hemisphere during the FGGE (First GARP Global Experiment) year
[AD-A135382] N84-17759
Effect of diabatic and frictional processes on frontal circulations
[PB84-104074] N84-17778
Frontogenesis in a moist atmosphere
[PB84-104066] N84-17779
FGGE level 3-B daily global analyses. Part 2: (Mar. 1979 - May 1979)
[PB84-100270] N84-17780

ATMOSPHERIC COMPOSITION
The retrieval of atmospheric constituent mixing-ratio profiles from solar absorption spectra
[NASA-CR-173303] N84-17730
A theoretical analysis of the past variations in global atmospheric composition and temperature structure N84-17754
Human exposure to atmospheric concentrations to selected chemicals, volume 1
[PB84-102540] N84-17835
Proposals for VIRA (Venus International Reference Atmosphere): Chemical composition of atmosphere below 100 km
[PR-830] N84-18134

ATMOSPHERIC CONDUCTIVITY
Estimation of North America anthropogenic sulfur deposition as a function of source/receptor separation
[DE84-003638] N84-17701

ATMOSPHERIC DIFFUSION
A model for simulation of a fluctuating plume
[FOA-C-40165-A1(C1)] N84-17741

ATMOSPHERIC EFFECTS
A theoretical analysis of the past variations in global atmospheric composition and temperature structure N84-17754

ATMOSPHERIC ENTRY SIMULATION
Re-entry and simulation
[AD-A135515] N84-17201

ATMOSPHERIC MOISTURE
Effect of diabatic and frictional processes on frontal circulations
[PB84-104074] N84-17778
Frontogenesis in a moist atmosphere
[PB84-104066] N84-17779

ATMOSPHERIC PHYSICS
Kinetic energy in the northern hemisphere during the FGGE (First GARP Global Experiment) year
[AD-A135382] N84-17759

ATMOSPHERIC RADIATION
Analysis of longwave radiation for the Earth-atmosphere system
[NASA-CR-173155] N84-17437

ATMOSPHERIC SCATTERING
Photon-burst correlation techniques for atmospheric crosswind measurements
[AD-A134617] N84-17735

ATMOSPHERIC SOUNDING
Ion source for a rocket payload
[AD-A135051] N84-17289

ATMOSPHERIC STRATIFICATION
Experimental water tunnel with density stratification for the simulation of small-scale atmospheric flows
[BLL-RISLEY-TR-4871-(9091.9F)] N84-17188

ATMOSPHERIC TEMPERATURE
A program of research in environmental modeling
[NASA-CR-173281] N84-17697
A theoretical analysis of the past variations in global atmospheric composition and temperature structure N84-17754

ATMOSPHERIC TIDES
Possible tidal modulation of the Indian monsoon onset
[AD-A135441] N84-17760

ATMOSPHERIC TURBULENCE
Doppler lidar signal and turbulence study
[NASA-CR-170976] N84-17574

ATOMIC BEAMS
Atomic hydrogen maser investigations of hydrogen atom interactions from 4 K to 12 K
[AD-A134917] N84-17582

ATOMIC CLOCKS
Journal of Research of the National Bureau of Standards. Volume 88, Number 5, September-October 1983
[PB84-125293] N84-17406
Model mission study for laser synchronization of clocks
[SNIAS-221-CA/LP] N84-17569

ATOMIC COLLISIONS
Progress in numerical calculations of ion-atom collisions
[DE84-003405] N84-18033

ATOMIC PHYSICS
Basic and applied research in the field of electronics and communications
[AD-A135283] N84-17487
RLE (Research Laboratory of Electronics)
[AD-A134812] N84-17495

ATOMIC SPECTRA
Detection of elements in biomedical fluids by laser-induced breakdown spectroscopy
[DE84-003838] N84-17319

ATTITUDE CONTROL
Study of Attitude Control and Guidance System (ACGS) for orbit change stage
[ESA-CR(P)-1797] N84-17285

ATTITUDE GYROS
Canadian Attitude Sensing Experimental Package (CASEP) N84-17223

AUDITORY PERCEPTION
Auditory induction of discrete tones in signal detection tasks
[AD-A135502] N84-18019

AUDITORY SIGNALS
Auditory induction of discrete tones in signal detection tasks
[AD-A135502] N84-18019

AURORAL IONIZATION
Auroral ion acceleration
[PR-783] N84-17715

AURORAL ZONES
Effects of small-scale plasma disturbance on the IKB-1300 spacecraft potential
[PR-839] N84-17208

AURORAS
Auroral ion acceleration
[PR-783] N84-17715

AUSTENITE
Heat treatment and residual austenite
[CSIR-TRANS-1704] N84-17349
On the effect of fine grain size on the M sub s temperature in Fe-27Ni-0.025C alloys
[AD-A134807] N84-17366

AUSTENITIC STAINLESS STEELS
Improved swelling resistance for PCA austenitic stainless steel under HFIR irradiation through microstructural control
[DE84-003203] N84-17370
Effects of pulsed and/or dual ion irradiation on microstructural evolution in a Ti and Si modified Austenitic alloy
[DE84-003411] N84-17374
Temperature aspects of pulsed ion bombardment in an austenitic alloy
[DE84-003382] N84-17376

AUTOMATIC CONTROL
Deployable beam flight experiment (MAST) N84-17218
Power subsystem automation study
[NASA-CR-170974] N84-17686
Experience with a regular expression compiler
[AD-A135202] N84-17888

AUTOMATIC FREQUENCY CONTROL
Carrier acquisition and tracking by a COSTAS-loop with automatic frequency control
[DFVLR-FB-83-24] N84-17202

AUTOMATIC TEST EQUIPMENT
ATE, ATLAS and the microprocessor --- automatic test equipment (ATE); abreviated test language for all systems (ATLAS) N84-17872

AUTOMATION
A program for developing automated scientific-information processing in maritime economy
[AD-A135518] N84-18107

AUTOMOBILE ENGINES
Automotive Stirling engine development program
[NASA-CR-168205] N84-18117

AUTONOMIC NERVOUS SYSTEM
Autonomic influences on peripheral circulatory and thermal responses to cold
[AD-A134444] N84-17831

AUTOREGRESSIVE PROCESSES
Asymptotic properties of extended Yule-Walker estimates of the AR parameters of an ARMA (autoregressive moving-average)
[AD-A134981] N84-17970

AVALANCHE DIODES
Optimum design of millimeter-wave impatt diode oscillators
[AD A135335] N84-17489

AVERAGE
Formulae for configuration averages of products of 1-body and 2-body operators in many-fermion spaces
[DE84-002634] N84-17971

AVIONICS
Control strategies for complex systems for use in aerospace avionics
[AD-A135072] N84-17179
Human factors issues associated with the use of speech technology in the cockpit
[NASA-CR-166548] N84-17433
Automation, supervisory control and workload in flight management
[NASA-CR-166474] N84-17838
Automated data base implementation requirements for the avionics planning baseline, Army
[AD-A135259] N84-18103

AXES OF ROTATION
Frequency and mode shape calculations for vertical axis wind turbines using reduction techniques and complex eigensolvers
[DE84-003316] N84-17633

AXIAL STRESS
Evaluation of a biaxial test fixture
[AD-A134845] N84-17629

AXISYMMETRIC FLOW
Experimental investigation of the turbulent axisymmetric jet N84-17518

B

B-1 AIRCRAFT
Airloads research study. Volume 1: Flight test loads acquisition
[NASA-CR-170409] N84-17173
Airloads research study. Volume 2: Airload coefficients derived from wind tunnel data
[NASA-CR-10410] N84-17174

BACKSCATTERING
Ion beam modification of ceramics
[DE84-003302] N84-17403
A study of the dependence of radar backscatter cross section on wind speed and wave slope from the MARSEN experimental results (a contribution to studies of radar backscattering from the sea surface). Supplement to final report
[AD-A135041] N84-17441
Approaches to radar image interpretation N84-17669
NIMBUS-7 SBUV (Solar Backscatter Ultraviolet) observations of solar UV spectal irradiance variations caused by solar rotation and active-region evolution for the period November 7, 1978 - October 26, 1979
[PB84-108166] N84-17743
Thresholds of Raman backscatter: Effects of collisions and Landau damping
[DE84-003736] N84-18060

BALL BEARINGS
The ball bearing as a rheological test device
[NASA-TM-83570] N84-17591

BALLOON-BORNE INSTRUMENTS
High resolution X- and gamma-ray spectroscopy of cosmic X-ray sources
[NASA-CR-175368] N84-18148

BANACH SPACE
Regular operator approximation theory
[HMI-B-389] N84-18008

BANDPASS FILTERS
An active filter primer
[AD-A134838] N84-17498

BANDWIDTH
Amplitude Compandored Sideband compared to conventional frequency modulation for VHF mobile radio: Laboratory and field testing results
[PB84-116383] N84-17474
Advanced filter technology
[AD-A135446] N84-18050

BARIUM COMPOUNDS
Study of intermetallic compounds in ternary systems Al-Ba-Nd and Al-Ba-Yb
[BLL-M-35387-(5828.4)] N84-17343

BARRIER LAYERS
The role of potential barrier formation in spacecraft charging N84-17269

BARRIERS (LANDFORMS)
Distance measurement to line of sight obstacles close to roads, a commission from Statens Vaeg och Trafikinstitute (VTI) --- distance measuring with a continuous wave laser
[FOA-C-30333-E1] N84-17586

BARYONS
Mean field theory of the linear sigma-model: Chiral solitons
[DE84-002864] N84-18034
BASIC (PROGRAMMING LANGUAGE)
Sperry Univac, Univac 1100/80, UBASIC/BBASIC level 9R1
[PB84-113901] N84-17919
BATHYMETERS
NODC (National Oceanographic Data Center) inventory of XBT data along transects in U.S. Atlantic and Gulf coastal waters from NMFS/MARD ship of opportunity program for 1981
[PB84-122662] N84-17802
BAYES THEOREM
A Bayesian explanation of an apparent failure rate paradox
[AD-A134748] N84-17987
BEAM INJECTION
External injection into a high current modified betatron accelerator
[AD-A134694] N84-18030
BEAM LEADS
Deployable beam flight experiment (MAST) N84-17218
Erectable beam experiment N84-17219
BEAM NEUTRALIZATION
Beam front accelerators
[DE84-003709] N84-18032
BEAMS (SUPPORTS)
Erectable beam experiment N84-17219
The STEP/STACBEAM experiment technology development for very large solar array deployers N84-17220
Technical theory of pneumatic beams --- inflated beams
[FOA-C-20504-E4] N84-17634
BEAUFORT SEA (NORTH AMERICA)
Statistical aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea
[AD-A134428] N84-17798
BETA PARTICLES
Electrode noise in beta aluminas
[AD-A134837] N84-17497
BETATRONS
External injection into a high current modified betatron accelerator
[AD-A134694] N84-18030
BETHE-SALPETER EQUATION
Research in theoretical nuclear physics
[DE84-003442] N84-18038
BIBLIOGRAPHIES
Aeronautical engineering. A continuing bibliography with indexes, supplement 169, January 1984
[NASA-SP-7037(169)] N84-17117
Biological Effects of Nonionizing Electromagnetic Radiation, volume 7, number 2-4, July - December 1982
[AD-A134674] N84-17805
Rotary wing aircraft and technical publications of NASA, 1970 - 1982
[NASA-TM-85521] N84-18102
Theory of image analysis and recognition
[AD-A135453] N84-18106
BINARY SYSTEMS (MATERIALS)
Characterization of high temperature electrically conducting oxides
[DE84-002887] N84-18076
BINOMIALS
On using selection procedures with binomial models
[AD-A135275] N84-17957
BIOASSAY
Manual of analytical methods for radiobioassay
[DE84-003978] N84-17318
BIOCHEMISTRY
Detection of elements in biomedical fluids by laser-induced breakdown spectroscopy
[DE84-003838] N84-17319
BIOELECTRICITY
Assessment of the functional state of the heart muscle in aircrew members by means by bicycle ergometry N84-17815
ERG (Electroretinogram) implicit time: An exploration of high frequency wavelets recorded in the human visual system
[AD-A134575] N84-17832
BIOLOGICAL EFFECTS
Development of power system measurements
[PB84-109891] N84-17509
Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707
Biological Effects of Nonionizing Electromagnetic Radiation, volume 7, number 2-4, July - December 1982
[AD-A134674] N84-17805
BIOLOGICAL EVOLUTION
Comparison of organisms and cell types using two-dimensional electrophoresis
[DE84-003574] N84-17807
BIOPHYSICS
RLE (Research Laboratory of Electronics)
[AD-A134812] N84-17495
BIOTITE
Possibility of investigation of Kimerlite pipes by superconductive geomagnetic variation measuring stations
[CSIR-TRANS-1701] N84-17724
BIREFRINGENCE
Advanced filter technology
[AD-A135446] N84-18050
BISMUTH OXIDES
Ionic conductivity of Li7BiO6
[AD-A135386] N84-17307
BLACK BODY RADIATION
Theoretical studies of solar-pumped lasers
[NASA-CR-173283] N84-17576
BLANKETS (FUSION REACTORS)
Fusion reactors: Physics and technology
[DE83-017148] N84-18055
BLINDNESS
The 1980 and 1981 accident experience of civil airmen with selected visual pathology
[AD-A134898] N84-17158
BLOOD
Behavioral change of blood lactate metabolism
[PB84-100171] N84-17850
BLOOD CIRCULATION
Investigation of the microcirculation of the conjunctiva in airmen with the initial symptoms of cerebral atherosclerosis N84-17818
Blood flow measurements under high-G conditions: Early prediction of Gz tolerance
[AD-A134653] N84-17823
BLUE GREEN ALGAE
The effect of various carbon sources on the growth of single-celled cyanophyta
[NASA-TM-77090] N84-17804
BLUNT BODIES
Universal single level implicit algorithm for gasdynamics
[NASA-CR-166531] N84-17936
BODIES OF REVOLUTION
Three-dimensional turbulent boundary layer on a body of revolution at incidence
[AD-A135454] N84-17539
BODY FLUIDS
Detection of elements in biomedical fluids by laser-induced breakdown spectroscopy
[DE84-003838] N84-17319
BODY MEASUREMENT (BIOLOGY)
Blood flow measurements under high-G conditions: Early prediction of Gz tolerance
[AD-A134653] N84-17823
BODY TEMPERATURE
Effect of the microclimate on the night sleep and physical fitness of seamen during a cruise in the low latitudes N84-17813
BODY-WING CONFIGURATIONS
Studies and vorticity effects by the Euler equations with emphasis on supersonic flow fields
[AD-A135118] N84-17535
BOILING
Concentration of sulphuric acid: Premature failure of Bamag pots
[MRL-R-885] N84-17301
BOOLEAN ALGEBRA
Foundations of computer science 4. Distributed systems. Part 2: Semantics and logic
[MATH-CENTRE-TRACTS-159-PT-2] N84-17879
Ten years of Hoare's logic, a survey. Part 2: Nondeterminism N84-17882
BOOTS (FOOTWEAR)
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824
BORON COMPOUNDS
Expanded ignition effectiveness tests of selected igniter materials with Navy propellants
[AD-A134704] N84-17312
BORON NITRIDES
Aspects of the grinding process
[CSIR-TRANS-1694] N84-17416
Dressing methods for grinding wheels made of superhard abrasive materials
[CSIR-TRANS-1700] N84-17419
On the use of diamond and cubical boron nitride abrasives in automatic honing applications
[CSIR-TRANS-1640] N84-17420
BOUNDARIES
Estimation techniques for transport equations
[AD-A135092] N84-17945
BOUNDARY LAYER EQUATIONS
Similar velocity profiles and integral quantities of a boundary layer on a rotating cylinder
[VKI-NT-148] N84-17553
BOUNDARY LAYER FLOW
Finite element method for incompressible laminar boundary layer flows N84-17126
Photodiagnostics of turbulent flows using laser-induced fluorescence
[NASA-CR-166546] N84-17519
Numerical simulation of flow over rough surfaces, including effects of shock waves
[AD-A134700] N84-17545
Effect of diabatic and frictional processes on frontal circulations
[PB84-104074] N84-17778
La Recherche Aerospatiale bimonthly bulletin, number 1983-3, 214/May-June
[ESA-TT-822] N84-18014
BOUNDARY LAYER STABILITY
Stability of the laminar boundary layer in a streamwise corner
[NASA-CR-173282] N84-17532
BOUNDARY LAYER TRANSITION
Correlations of supersonic boundary-layer transition on cones including effects of large axial variations in wind-tunnel noise
[NASA-TP-2229] N84-17534
BOUNDARY LUBRICATION
Hydrodynamic lubrication of rigid nonconformal contacts in combined rolling and normal motion
[NASA-TM-83578] N84-17592
BOUNDARY VALUE PROBLEMS
Shape optimal design and free boundary value problems N84-17516
The effect of the artificial far field boundary on a finite different approximation of the Navier-Stokes equations for a compressible fluid
[AD-A135152] N84-17536
Temporal finite elements based on a minimum principle for initial value problems N84-17935
Smoothness of bounded solutions of nonlinear evolution equations
[AD-A135294] N84-17958
Numerical solution of singular integral equations arising in mixed boundary value problems of elasticity
[AD-A134673] N84-17965
BRANCHING (MATHEMATICS)
Bifurcation analysis of aircraft pitching motions near the stability boundary
[NASA-TM-85881] N84-17137
Smoothness of bounded solutions of nonlinear evolution equations
[AD-A135294] N84-17958
BREADBOARD MODELS
• Breadboard stellar tracker system test report
[NASA-CR-170973] N84-17166
BREAKWATERS
West breakwater, Sines (Portugal) --- conferences N84-17785
West breakwater-Sines (Portugal). Overview of rehabilitation and synthesis of project N84-17786
West breakwater-Sines (Portugal): Study of armor stability N84-17788
West breakwater-Sines (Portugal): New aspects of armor units N84-17789
BRIDGMAN METHOD
Growth and evaluation of AgGaS2 and AgGaSe2 for infrared nonlinear applications
[NASA-CR-175185] N84-18066
BRIGHTNESS TEMPERATURE
Dual channel water vapor radiometer system
[PB84-119445] N84-17746
BROADBAND
A diagnostic probe to investigate propagation at millimeter wavelengths
[PB84-104223] N84-17473
Adaptive feedforward linear wideband HF power bank
[AD-A134744] N84-17493
Handbook for broadband isotropic antenna system. Volume 1: Operation manual
[PB84-101948] N84-17510
BUBBLES
The effect of gas bubbles and cavity dimensions on the local electrode potential within pits, crevices and cracks
[AD-A134729] N84-17364
Interaction of weak shock waves and discrete gas inhomogeneities N84-17517
Experimental study of bubble cavities attached to a rotating shaft in a reservoir
[NASA-TM-83586] N84-17533
BUCKLING
Technical theory of pneumatic beams --- inflated beams
[FOA-C-20504-E4] N84-17634

BULK ACOUSTIC WAVE DEVICES
S-band SBAW microwave source, phase 2
[NASA-CR-175153] N84-17432
BUNCHING
Power-amplification of a heavy-ion beam in an induction linac
[DE84-002911] N84-18042
BURSTS
The use of burst transmission to increase communication range: A feasibility study
[PB84-111400] N84-17467
BUSHINGS
Distribution of unit pressures in universal spindle joint N84-17588

C

C BAND
Cylindrical microstrip array: C-band beacon antenna array with 48 rectangular radiating elements fed in-phase
[AD-A135144] N84-17442
C-130 AIRCRAFT
Data acquisition for evaluation of an airborne lightning detection system
[AD-A135318] N84-17153
CADMIUM COMPOUNDS
Homogeneity and magnetic susceptibility in some substituted cadmium spinels
[AD-A135297] N84-17357
CALCULUS OF VARIATIONS
La Recherche Aerospatiale, bimonthly bulletin number 1983-2, 213/March-April
[ESA-TT-817] N84-18013
CALIBRATING
Look at techniques for the dimensional calibration of standard microscopic particles
[PB84-112648] N84-17324
Development of power system measurements
[PB84-109891] N84-17509
A detailed evaluation of the Endevco model 7302 (trade name) angular accelerometer
[AD-A134882] N84-17562
AC voltage calibrations for the 0.1 Hz to 10 Hz frequency range
[PB84-109867] N84-17570
Calibration measurements of Doppler receivers --- satellite Doppler positioning N84-17647
Torsional ultrasonic technique for reactor vessel liquid level measurement
[DE84-003357] N84-18024
Effects of systematic errors on the mixing ratios of trace gases obtained from occulation spectra
[NASA-CR-175371] N84-18046
Hot wire in low Reynolds number flow N84-18087
Flow behavior in the Wright Brothers Facility
[WBWT-TR-1187] N84-18088
Luminosity calibration of low redshift quasars
[NASA-CR-175372] N84-18120
CALIFORNIA
Effects of diesel vehicles on visibility in California
[PB84-122167] N84-17714
CALORIMETERS
The practical use of data as to the solution enthalpies of molten Fe-V-Si
[BLL-M-35430-(5828.4)] N84-17342
CAMERA TUBES
Streak cameras for soft X-ray and optical radiation
[DE84-002780] N84-17564
CAMERAS
Spas color camera
[NASA-CR-171739] N84-17559
CANADA
Chemical generation and deactivation of oxygen singlet delta
[AD-A135392] N84-17308
CAPACITORS
Switched-capacitor sampled-data networks with communication applications N84-17429
Linear inductive accelerator
[AD-A135547] N84-18029
CARBON
Ion deposited carbon coatings
[AD-A135068] N84-17390
Apparatus and method for destructive removal of particles contained in flowing fluid
[NASA-CASE-NPO-15426-1] N84-17555
Effects of diesel vehicles on visibility in California
[PB84-122167] N84-17714
The effect of various carbon sources on the growth of single-celled cyanophyta
[NASA-TM-77090] N84-17804
CARBON CYCLE
Chemical and biological processes in CO/sub 2-ocean models
[DE84-003304] N84-17702
CARBON DIOXIDE
Impact ionization effects on Pioneer Venus Orbiter N84-17270
Thermophysical properties of gaseous carbon dioxide/water mixtures
[PB84-125228] N84-17330
Can we delay a greenhouse warming
[DE84-003390] N84-17703
Advanced air revitalization system testing
[NASA-CR-166540] N84-17855
Electrochemical carbon dioxide concentrator subsystem development
[NASA-CR-166538] N84-17857
Effects of systematic errors on the mixing ratios of trace gases obtained from occulation spectra
[NASA-CR-175371] N84-18046
CARBON DIOXIDE LASERS
Pulsed heterodyne CO2 laser/scanner system. Volume 1: Assembly report
[AD-A135059] N84-17577
Pulsed heterodyne CO2 laser/scanner system. Volume 2: Operating instructions
[AD-A135060] N84-17578
CARBON FIBERS
Composite structural materials
[NASA-CR-173259] N84-17293
CARBON MONOXIDE
An analysis of carbon monoxide emissions as a function of ambient temperature and vehicle parameters
[PB84-103829] N84-17599
Turbulence and mass motion in galactic molecular clouds N84-18129
CARBON-CARBON COMPOSITES
Disclinations in carbon-carbon composites
[AD-A135248] N84-17295
CARBONACEOUS ROCKS
Conductivity mapping of underground flow channels and moisture anomalies in carbonate terrain using electromagnetic methods
[DE84-004098] N84-17677
CARBURIZING
Vacuum ionic carburisation
[BLL-OA-TRANS-3149-(6196.3)] N84-17291
CARDIOVASCULAR SYSTEM
Mathematical simulation of the cardiopulmonary system
[AD-A135460] N84-17822
CARGO SHIPS
Reducing risk in seaways --- around the British Isles N84-17163
CARRIER MOBILITY
High field transport of free carriers at the Si-SiO2 interface
[AD-A135338] N84-18071
CARTRIDGES
NSI-1 Squib adapter development and final test report for usage on space shuttle gas sampler valve/bottle assembly 3270
[NASA-CR-171735] N84-17556
CAST ALLOYS
Concentration of sulphuric acid: Premature failure of Bamag pots
[MRL-R-885] N84-17301
CASTING
Aging degradation of cast stainless steel: Status and program
[DE84-004018] N84-17381
CATHODES
Virtual cathode oscillations
[AD-A135120] N84-18027
The cathode material for a plasma-arc heater
[BLL-OA-TRANS-3126-(6196.3)] N84-18053
CATIONS
Diffusion mechanisms in transition-metal oxides
[DE84-003460] N84-18081
CAUCHY-RIEMANN EQUATIONS
Computational methods in number theory, part 2
[MATH-CENTRE-TRACTS-155-PT-2] N84-17999
The computation of Galois groups N84-18000
The first 200,000,001 zeros of Riemann's zeta function N84-18006
CAVITATION FLOW
Development of a high pressure water jet for the rapid removal of concrete
[PB84-109909] N84-17426
CAVITIES
Experimental study of bubble cavities attached to a rotating shaft in a reservoir
[NASA-TM-83586] N84-17533
Some topics in finite elasticity N84-17614
CAVITY RESONATORS
Preliminary tests of a second harmonic RF system for the intense pulsed neutron source synchrotron
[DE84-003595] N84-18041
CEILINGS (ARCHITECTURE)
Computer modeling of aircraft cabin fires
[PB84-101153] N84-17162
CELESTIAL MECHANICS
The celestial mechanics experiment (E 11) of HELIOS
[BMFT-FB-W-83-016] N84-18124
CELLS (BIOLOGY)
The effect of various carbon sources on the growth of single-celled cyanophyta
[NASA-TM-77090] N84-17804
Behavioral change of blood lactate metabolism
[PB84-100171] N84-17850
CELLULOSE NITRATE
Expanded ignition effectiveness tests of selected igniter materials with Navy propellants
[AD-A134704] N84-17312
CERAMICS
Ceramic components for gas turbines, phase 2
[BMFT-FB-T-83-198] N84-17183
Ceramic life prediction methodology - hot spin disc life program
[AD-A134783] N84-17400
Dynamic consolidation of ceramic powders: Practicalities, problems, and prospects
[DE84-003744] N84-17404
Electrode noise in beta aluminas
[AD-A134837] N84-17497
Theory of dynamic ferroelectricity
[DE84-002609] N84-17500
Characterization of high temperature electrically conducting oxides
[DE84-002887] N84-18076
CERENKOV RADIATION
The cosmic ray energy spectrum from 2 x 10-17 to 10-e-19 EV N84-18146
CERTIFICATION
IMCS reflight certification requirements and design specifications
[NASA-CR-170968] N84-17167
CHAINS
Kinematics and dynamics of multi-rigid-body open-chain systems: Application to robot manipulators N84-17851
CHANNEL CAPACITY
Capacity of mismatched Gaussian channels
[AD-A134982] N84-17455
CHANNEL FLOW
Flow technical problems with transitions between partial and complete filling and with flow measurement in channel sections. --- sewage flow
[TUM-SFB-81] N84-17552
CHANNELS
Conductivity mapping of underground flow channels and moisture anomalies in carbonate terrain using electromagnetic methods
[DE84-004098] N84-17677
CHANNELS (DATA TRANSMISSION)
Test Operations Procedure (TOP): Data transmission equipment
[AD-A134711] N84-17449
CHARGE COUPLED DEVICES
Distance measurement to line of sight obstacles close to roads, a commission from Statens Vaeg och Trafikinstitute (VTI) --- distance measuring with a continuous wave laser
[FOA-C-30333-E1] N84-17586
CHARGE TRANSFER DEVICES
Breadboard stellar tracker system test report
[NASA-CR-170973] N84-17166
CHARGED PARTICLES
Spacecraft/plasma interactions and their influence on field and particle measurements --- conferences
[ESA-SP-198] N84-17253
Contributions to the theory of quantum 1/f noise N84-18082
CHEBYSHEV APPROXIMATION
Spectral methods for the Euler equations: Chebyshev methods and shock-fitting
[NASA-CR-172295] N84-17118
CHEMICAL ANALYSIS
Quantitative Secondary Ion Mass Spectroscopy (SIMS)
[AD-A134195] N84-17315
Techniques for the inorganic analysis in a controlled ecological life support system N84-17853
CHEMICAL CLOUDS
Optical, radio and computer simulation studies of the Brazil ionospheric modification experiment of 8 September 1982
[AD-A135143] N84-17731
CHEMICAL COMPOSITION
Chemical generation and deactivation of oxygen singlet delta
[AD-A135392] N84-17308
Friction and wear reduction of 440C stainless steel by ion implantation
[DE84-003255] N84-17371

Fast diffusion of iron in single crystal rutile and iron doped rutile
[DE84-004021] N84-18079
Proposals for VIRA (Venus International Reference Atmosphere): Chemical composition of atmosphere below 100 km
[PR-830] N84-18134

CHEMICAL EFFECTS
Human exposure to atmospheric concentrations to selected chemicals, volume 1
[PB84-102540] N84-17835

CHEMICAL EXPLOSIONS
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17835

CHEMICAL PROPERTIES
Chemical and electrochemical properties in molten alkaline hydroxides
[BLL-RISLEY-TR-4854-(9091.9F)] N84-17298
Chemical and electrochemical properties in molten alkaline hydroxides. 3: Oxide and acid complexes of some metallic cations
[BLL-RISLEY-TR-4858-(9091.9F)] N84-17299
Structure, inhibition and extinction of polymer diffusion flames
[PB84-101336] N84-17327
Aviation-fuel property effects on combustion
[NASA-CR-168334] N84-17407

CHEMICAL REACTIONS
A photoacoustic study of chemically active systems
[AD-A134663] N84-17311
Ozone reactions in aqueous solutions: A bibliography
[PB84-109883] N84-17325
The ball bearing as a rheological test device
[NASA-TM-83570] N84-17591
Growth and evaluation of AgGaS2 and AgGaSe2 for infrared nonlinear applications
[NASA-CR-175185] N84-18066

CHEMICAL WARFARE
Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707

CHEMISORPTION
Comparison of photon stimulated dissociation of gas phase, solid and chemisorbed water
[AD-A134986] N84-17314
Research Laboratory of Electronics
[AD-A135319] N84-17488

CHIPS (ELECTRONICS)
Research in VLSI systems. Heuristic programming project and VLSI theory project. A fast turn around facility for very large scale integration (VLSI)
[AD-A134809] N84-17494

CHIRAL DYNAMICS
Mean field theory of the linear sigma-model: Chiral solitons
[DE84-002864] N84-18034

CHLORINE
Photochemical generation of the optoacoustic effect
[DE84-003712] N84-18023

CHLOROPHYLLS
In vitro chlorophyll photosynthetic reaction
[PB84-104892] N84-17810

CHROMATOGRAPHY
Journal of Research of the National Bureau of Standards. Volume 88, Number 3, May-June 1983
[PB84-115799] N84-17328
Inorganic analysis in a controlled ecological life support system
[NASA-CR-173299] N84-17852

CHROMIUM
Applications of solvent extraction in hydrometallurgy
[BLL-OA-TRANS-3162-(6196.3)] N84-17334
Chromium
[PB84-100682] N84-17385

CHROMIUM OXIDES
Characterization of high temperature electrically conducting oxides
[DE84-002887] N84-18076
Diffusion mechanisms in transition-metal oxides
[DE84-003460] N84-18081

CHROMIUM STEELS
Development of modified 9 Cr-1 Mo steel for elevated-temperature service
[DE84-003161] N84-17372

CIRCUIT RELIABILITY
INTAC: Digital and analog circuit test language
[INPE-2764-PRE/338] N84-17898

CIRCUITS
BERTHA: A versatile transmission line and circuit code
[AD-A135024] N84-17886

CIRCULATORY SYSTEM
Water immersion and its computer simulation as analogs of weightlessness
[NASA-CR-171746] N84-17821

CIVIL AVIATION
Semiannual report to Congress on the effectiveness of the civil aviation security program
[AD-A134860] N84-17156
Satellite-directed navigational guidance for aircraft
[H-REPT-98-510] N84-17164
Alternative fuels for general aviation
[GPO-27-618] N84-17409

CIVIL DEFENSE
Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707

CLAMPS
Flexible conformable clamps for a machining cell with applications to turbine blade machining
[AD-A134942] N84-17596

CLASSIFICATIONS
A catalogue of spreading modulation spectra
[AD-A134850] N84-17454
The effect of various carbon sources on the growth of single-celled cyanophyta
[NASA-TM-77090] N84-17804
The covariant classification of two-dimensional smooth commutative formal groups over an algebraically closed field of positive characteristic
[MATH-CENTRE-TRACTS-157] N84-17969

CLEAR AIR TURBULENCE
Atmospheric scintillation at 94 GHz
[AD-A134743] N84-17452

CLIMATE
Ocean research for understanding climatic variations: Priorities and goals for the 1980's
[PB84-105816] N84-17768

CLIMATOLOGY
Possible tidal modulation of the Indian monsoon onset
[AD-A135441] N84-17760
Meteorological applications library (CRH.LB)
[PB84-122639] N84-17776

CLINICAL MEDICINE
Military Medical Journal, no. 7, 1983
[L-2456] N84-17811
Military Medical Journal, no. 4, 1983
[L-2403] N84-17836

CLOSED ECOLOGICAL SYSTEMS
Inorganic analysis in a controlled ecological life support system
[NASA-CR-173299] N84-17852

CLOSURE LAW
Numerical study of a separating and reattaching flow by using Reynolds-stress tubulence closure
[NASA-CR-166547] N84-17133

CLOTTING
Formation and remodeling of the early wound matrix
[AD-A134576] N84-17833

CLOUD COVER
Cloud forecast fields comparison test
[AD-A135556] N84-17761

CLOUD PHYSICS
Light scattering condensation nuclei, and air mass trajectories at Whiteface Mountain: Summer 1982
[PB84-104363] N84-17742
Status for knowledge: Meteorological affected icing on aircraft in clouds
[DFVLR-MITT-83-12] N84-17763
Cloud physics investigations by the University of Wyoming in HIPLEX 1977-1982
[PB84-106756] N84-17770

CLOUD SEEDING
Cloud physics investigations by the University of Wyoming in HIPLEX 1977-1982
[PB84-106756] N84-17770
SCPP (Sierra Cooperative Pilot Project) forecasting support, volume 1
[PB84-107911] N84-17782

CLOUDS
Attenuation of millimeter waves on Earth-space paths by rain clouds
[PB84-115120] N84-17471
Estimation of parameters of spray clouds
[BLL-TRANS-1571-(9022.552)] N84-17752

CLOUDS (METEOROLOGY)
Light scattering condensation nuclei, and air mass trajectories at Whiteface Mountain: Summer 1982
[PB84-104363] N84-17742
A laboratory investigation of the reflective properties of simulated, optically thick clouds
[NASA-CR-175362] N84-17755
Cloud forecast fields comparison test
[AD-A135556] N84-17761
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773

CLUSTER ANALYSIS
A model for ordinal filtering of digital images
[AD-A134705] N84-18052

CMOS
Effects of space radiation on advanced semiconductor devices. Part 2: Cosmic ray simulation experiments for the study of single event upsets in CMOS technology
[G-2745-VOL-2] N84-17506

COAL DERIVED GASES
Experimental investigation concerning the feasibility of electrostatic precipitators at high pressures and temperatures --- gas cleaning systems for coal conversion
[BMFT-FB-T-83-201] N84-17704

COASTAL ECOLOGY
Proceedings of the 18th International Conference on Coastal Engineering
[ISBN-0-7988-2553-7] N84-17783

COASTAL PLAINS
Evaluation of the FEMA (Federal Emergency Management Agency) model for estimating potential coastal flooding from hurricanes and its application to Lee County, Florida
[PB84-105832] N84-17769

COASTAL WATER
NODC (National Oceanographic Data Center) inventory of XBT data along transects in U.S. Atlantic and Gulf coastal waters from NMFS/MARD ship of opportunity program for 1981
[PB84-122662] N84-17802

COASTS
Remote sensing: New satellite systems and potential applications --- conferences
[ESA-SP-205] N84-17650
Coastal zones inventory by high resolution satellites
N84-17661
Northeast Scotland coastal field guide and geographical essays
[AD-A134861] N84-17674
Proceedings of the 18th International Conference on Coastal Engineering
[ISBN-0-7988-2553-7] N84-17783
Nearshore current model workshop summary
[AD-A134702] N84-17791
Methodology for the calculation of a shallow-water wave climate
[AD-A134715] N84-17792

COATINGS
Aluminum-manganese plating from a molten salt bath
[AD-A135240] N84-17356
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A135549] N84-17363
Polymeric glazings
[DE84-000016] N84-17402

COAXIAL FLOW
Mass and momentum turbulent transport experiments with confined swirling coaxial jets
[NASA-CR-168252] N84-17530

COBALT ALLOYS
Preliminary study of thermomechanical fatigue of polycrystalline MAR-M 200
[NASA-TP-2280] N84-17350
Influence of cobalt, tantaum and tungsten on the high temperature mechanical properties of single crystal nickel-base superalloys
[NASA-TM-83479] N84-17355

COBOL
Four Phase Systems, Incorporated IV/90 Mod 2 COBOL '74 release BE07
[PB84-102706] N84-17923
Four Phase Systems, Incorporated IV/90 Mod 2 COBOL '74 release BE07.COBOL technical report
[PB84-102714] N84-17924

COCKPITS
CDTI target selection criteria
[NASA-CR-3776] N84-17178
Automation, supervisory control and workload in flight management
[NASA-CR-166474] N84-17838

CODERS
Coding of full motion color video signals at 50 kb/s
[AD-A134319] N84-17456

CODING
Jam-resistant speech encoding
[AD-A134707] N84-17448
Investigation of encryptation for satellite communications
[FOA-C-30300-E1] N84-17457
Simply instrumentable and optimal digitization of analog information sources
[AD-A135124] N84-17484
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1
[AD-A135232] N84-17485

Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2
[AD-A135233] N84-17486
BERTHA: A versatile transmission line and circuit code
[AD-A135024] N84-17886
On a secure public-key cryptosystem N84-17997
COEFFICIENTS
Estimation of temporally and spatially varying coefficients in models for insect dispersal
[AD-A135093] N84-17946
Nonlinear resonance
[AD-A135117] N84-17950
COGNITION
Cognition and arousal as predictors of risk taking: Effects of load and cognitive style
[AD-A134324] N84-17843
Task differences, stylistic characteristics and physiological arousal
[AD-A134335] N84-17844
Effects of load, cognitive complexity and type A on satisfaction
[AD-A134415] N84-17846
The effect of locus of control on performance with man-machine dialogues N84-18098
COHERENT RADIATION
The evolution of spontaneous and coherent radiation in the free electron laser oscillator
[AD-A134458] N84-17583
COLD FRONTS
Effect of diabatic and frictional processes on frontal circulations
[PB84-104074] N84-17778
COLD PLASMAS
The DC electric field in space: Direct measurements and inferences from cold plasma drifts N84-17264
COLD TOLERANCE
Arctic personnel effects
[AD-A134892] N84-17829
Autonomic influences on peripheral circulatory and thermal responses to cold
[AD-A134444] N84-17831
COLD WEATHER
An analysis of carbon monoxide emissions as a function of ambient temperature and vehicle parameters
[PB84-103829] N84-17599
COLLISIONS
Solitary waves in water colliding head-on
[AD-A135537] N84-17964
COLOR INFRARED PHOTOGRAPHY
Remote sensing for agriculture and land use N84-17666
Remote sensing for geology N84-17668
COLOR PHOTOGRAPHY
Spas color camera
[NASA-CR-171739] N84-17559
COMBAT
Robotic technology applied to Army mobility systems
[AD-A134728] N84-17933
COMBUSTION
Considerations on the external combustion system of the Stirling hot gas engine
[NASA-TM-77026] N84-17302
Bifurcation and stability theory with application to problems of combustion and flame propagation
[AD-A135383] N84-17306
Technique for the rapid generation of OH radicals behind shock waves and its application to the study of combustion kinetics
[DE84-003183] N84-17317
Flammability characteristics of some epoxy resins and composites
[AD-A135282] N84-17394
COMBUSTION CHAMBERS
Prediction of an apparent flame length in a co-axial jet diffusion flame combustor
[AD-A135088] N84-17303
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 1: Two-dimensional laser Doppler anemometer studies of isothermal flowfield in a ducted centerbody combustor
[AD-A134691] N84-17542
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 2: Numerical predictions of isothermal flowfields in a ducted centerbody combustor
[AD-A134692] N84-17543
COMBUSTION PHYSICS
On the propagation laws of combustion waves in solids (pyrotechnic reactions)
[BLL-TRANS-1098-(7291.796S)] N84-17300
COMBUSTION PRODUCTS
Inertial Upper Stage (IUS) Solid Rocket Motor (SRM) core flow sampling at high altitudes
[AD-A134997] N84-17288
Combustion gas spectroscopy using tunable lasers
[DE84-004976] N84-17320
Chemical and biological processes in CO/sub 2-ocean models
[DE84-003304] N84-17702
COMBUSTION TEMPERATURE
Intracavity laser excitation of NCO fluorescence in an atmospheric pressure flame
[AD-A134740] N84-17579
COMMERCE
Transfer of civil meteorological satellites
[H-REPT-98-509] N84-17238
COMMERCIAL AIRCRAFT
Semiannual report to Congress on the effectiveness of the civil aviation security program
[AD-A134860] N84-17156
COMMUNICATION EQUIPMENT
Test Operations Procedure (TOP): Data transmission equipment
[AD-A134711] N84-17449
COMMUNICATION NETWORKS
Switched-capacitor sampled-data networks with communication applications N84-17429
Traffic routing in a switched regenerative satellite. Volume 1, task 3: Traffic assignment
[ESA-CR(P)-1792-VOL-1] N84-17463
Traffic routing in a switched regenerative satellite. Volume 2, task 4: Review (executive summary)
[ESA-CR(P)-1792-VOL-2] N84-17464
V-band integrated quadriphase modulator
[NASA-CR-175159] N84-17480
A distributed procedure to detect and/or deadlock
[AD-A135459] N84-17904
Model and analysis of a communication interface with distributed processing for application in a communication network by packet switching
[INPE-2773-TDL/136] N84-17926
COMMUTATORS
The covariant classification of two-dimensional smooth commutative formal groups over an algebraically closed field of positive characteristic
[MATH-CENTRE-TRACTS-157] N84-17989
COMPACTING
Shock compaction of molybdenum powder
[NASA-CR-173154] N84-17369
Dynamic consolidation of ceramic powders: Practicalities, problems, and prospects
[DE84-003744] N84-17404
COMPARISON
A statistical technique for forecasting severe weather from vertical soundings by satellite and radiosonde
[PB84-114099] N84-17772
COMPATIBILITY
Surface compatibility studies of potassium perchlorate reaction with pyrotechnic fuels
[DE84-002829] N84-17412
A method of measurement of behavioral factors affecting information systems design and use: An application of multidimensional scaling in uncovering individual psychological structure N84-18099
COMPETITION
Effects of load, cognitive complexity and type A on satisfaction
[AD-A134415] N84-17846
COMPILERS
Experience with a regular expression compiler
[AD-A135202] N84-17888
A demand-driven, coroutine-based implementation of a nonprocedural language N84-17895
Sperry Univac, Univac 1100/80, UBASIC/BBASIC level 9R1
[PB84-113901] N84-17919
Sperry Univac, Univac 1100/80, ASCII FORTRAN level 10R1A
[PB84-113893] N84-17920
Four Phase Systems, Incorporated IV/90 Mod 2 COBOL '74 release BE07
[PB84-102706] N84-17923
Four Phase Systems, Incorporated IV/90 Mod 2 COBOL '74 release BE07.COBOL technical report
[PB84-102714] N84-17924
COMPLETENESS
Notions of dependency satisfaction
[AD-A135303] N84-17902
COMPLEX COMPOUNDS
Synthesis and characterization of binuclear Schiff base complexes of nickel, copper, and manganese
[AD-A135493] N84-17360
COMPLEXITY
Partially ordered computations with applications to VLSI design N84-17880
Machine models, computational complexity and number theory N84-17991
COMPONENT RELIABILITY
Sortie duration and helicopter component failures (an empirical study)
[AD-A134745] N84-17122
COMPOSITE MATERIALS
Estimating the cost of composite material airframes using the Rand Corporation Development and Procurement Costs of Aircraft parametric model (DAPCA III)
[AD-A134993] N84-17120
Composite structural materials
[NASA-CR-173259] N84-17293
Ultrastructure processing and environmental stability of advanced structural and electronic materials
[AD-A135107] N84-17391
COMPOSITE STRUCTURES
Development of a stable epoxy resin system for composite repair
[AD-A135390] N84-17395
COMPRESSIBLE FLOW
Spectral methods for the Euler equations: Fourier methods and shock-capturing
[NASA-CR-172294] N84-17119
COMPRESSION LOADS
Nonlinear geometric, material and time dependent analysis of reinforced concrete shells with edge beams
[PB84-104454] N84-17639
COMPRESSORS
Heat pump units with electrically driven compressors for water heating
[BLL-OA-TRANS-3181-(6196.3)] N84-17514
COMPUTATION
TERR, PERR, and GIGC: Three programs to compute verification statistics
[PB84-127521] N84-17775
Modelling algorithm execution time on processor arrays
[NASA-CR-172289] N84-17899
Thermodynamics library for AFOS (Automation of Field Operations and Services) programmers (THERMO LB)
[PB84-122621] N84-17925
International Conference on Stiff Computation
[AD-A135265] N84-17958
Computational methods in number theory, part 1
[MATH-CENTRE-TRACTS-154-PT-1] N84-17990
Machine models, computational complexity and number theory N84-17991
Fast arithmetic operations on numbers and polynomials N84-17992
Analysis and comparison of some integer factoring algorithms N84-17995
Perfect numbers and aliquot sequences N84-17996
COMPUTATIONAL FLUID DYNAMICS
Programs for calculating quasi-three-dimensional flow in a turbomachine blade row
[NASA-TM-83588] N84-17138
Computation of potential flows with embedded vortex rings and applications to helicopter rotor wakes
[NASA-CR-166542] N84-17526
Studies and vorticity effects by the Euler equations with emphasis on supersonic flow fields
[AD-A135118] N84-17535
COMPUTATIONAL GRIDS
The effect of the artificial far field boundary on a finite different approximation of the Navier-Stokes equations for a compressible fluid
[AD-A135152] N84-17536
L2-projection for transferring data between finite element meshes
[DE84-000063] N84-17973
Automatic adaptive grid refinement for the Euler equations
[NASA-CR-173161] N84-17977
A cooperative program to stimulate student involvement through the MIT Undergraduate Research Opportunity Program
[NASA-CR-173300] N84-18086
Calculating C-grids with fine and embedded mesh regions
[CFDL-TR-83-7] N84-18090
COMPUTER AIDED DESIGN
Cylindrical microstrip array: C-band beacon antenna array with 48 rectangular radiating elements fed in-phase
[AD-A135144] N84-17442
Constraint driven synthesis of hardware design N84-17870
Initial graphics exchange specification test library, version 1.3
[PB84-102144] N84-17922
COMPUTER AIDED MANUFACTURING
Initial graphics exchange specification test library, version 1.3
[PB84-102144] N84-17922

COMPUTER ASSISTED INSTRUCTION
Proceedings of the Conference on Joint Problem Solving and Microcomputers
[AD-A135001] N84-17901
Desk-top computer controlled instrument lathe for machining with high form accuracy
[FOA-C-30339-E1,E3] N84-17918

COMPUTER COMPATIBLE TAPES
APQ-102 imaging radar digital image quality study
[NASA-CR-171738] N84-17435

COMPUTER DESIGN
Research in VLSI systems. Heuristic programming project and VLSI theory project. A fast turn around facility for very large scale integration (VLSI)
[AD-A134809] N84-17494
Constraint driven synthesis of hardware design N84-17870

COMPUTER GRAPHICS
IMAGES: A digital computer program for interactive modal analysis and gain estimation for eigensystem synthesis
[NASA-TM-85690] N84-17186
Foundations of computer science 4. Distributed systems. Part 1: Algorithms and complexity
[MATH-CENTRE-TRACTS-158-PT-1] N84-17873
VLSI, algorithms and graphics N84-17878
TIGS (table plot interactive graphics system)--an interactive graphical system for the creation and correction of tabular data sets
[AD-A135522] N84-17906
Hexagonal data base study
[AD-A135512] N84-17907
Advanced edit system
[AD-A134952] N84-17913
Initial graphics exchange specification test library, version 1.3
[PB84-102144] N84-17922
De-excitation and equipartition in H2-surface collisions
[DE84-003008] N84-18031

COMPUTER INFORMATION SECURITY
On a secure public-key cryptosystem N84-17997

COMPUTER NETWORKS
Foundations of computer science 4. Distributed systems. Part 1: Algorithms and complexity
[MATH-CENTRE-TRACTS-158-PT-1] N84-17873
Distributed computing N84-17874
Systolic computation and VLSI N84-17877
RADC (Rome Air Development Center) DDP (Distributed Data Processing) topology evaluation
[AD-A134701] N84-17909
Computer networks without a shared memory
AFOSR-81-0197
[AD-A135074] N84-17927
Performance evaluation and control of distributed computer communication networks
[AD-A135121] N84-17928
Distributed algorithms for various problems
[AD-A135452] N84-18105

COMPUTER PROGRAMMING
Automatic synthesis of abstract data type implementations from abstract specifications N84-17896
Desk-top computer controlled instrument lathe for machining with high form accuracy
[FOA-C-30339-E1,E3] N84-17918
Inquiry semantics: A functional semantics of natural language grammar
[AD-A135153] N84-17929

COMPUTER PROGRAMS
Computer modeling of aircraft cabin fires
[PB84-101153] N84-17162
A program for computer-controlled impedance measurement within the microwave range --- antennas
[FOA-C-30330-E3] N84-17460
Estimating the performance of telecommunication systems using the ionospheric transmission channel. Ionospheric communications analysis and prediction program user's manual
[PB84-111210] N84-17468
Computer models for two-dimensional transient heat conduction
[AD-A134893] N84-17549
Summary of earthquake intensity file: A computerized file of the effects of earthquakes in the United States
[PB84-101443] N84-17745
Use of digitized radar and microcomputers to forecast local floods and irrigation needs
[PB84-105568] N84-17767
TERR, PERR, and GIGC: Three programs to compute verification statistics
[PB84-127521] N84-17775
Meteorological applications library (CRH.LB)
[PB84-122639] N84-17776
Analysis of electrical accident prevention countermeasures
[PB84-102987] N84-17869
Verification of concurrent programs: A temporal proof system N84-17884
BERTHA: A versatile transmission line and circuit code
[AD-A135024] N84-17886
A computer program for solving the parabolic equation using an implicit finite-difference solution method and incorporating exact interface conditions
[AD-A135325] N84-17903
TIGS (table plot interactive graphics system)--an interactive graphical system for the creation and correction of tabular data sets
[AD-A135522] N84-17906
Empirical studies of program behaviour in virtual memory
[PB84-112267] N84-17921
Initial graphics exchange specification test library, version 1.3
[PB84-102144] N84-17922
Thermodynamics library for AFOS (Automation of Field Operations and Services) programmers (THERMO LB)
[PB84-122621] N84-17925
The effect of locus of control on performance with man-machine dialogues N84-18098
A method of measurement of behavioral factors affecting information systems design and use: An application of multidimensional scaling in uncovering individual psychological structure N84-18099
Multidomain, multirecord-type Datatrieve-11 databases
[DE84-001707] N84-18110

COMPUTER STORAGE DEVICES
The program complexity of searching a table
[AD-A135299] N84-18104

COMPUTER SYSTEMS DESIGN
Parallel computation N84-17875

COMPUTER SYSTEMS PERFORMANCE
Computer Science and Technology: Proceedings of the 19th Meeting of the Computer Performance Evaluation Users Group (CPEUG)
[PB84-114529] N84-17892
Modelling algorithm execution time on processor arrays
[NASA-CR-172289] N84-17899
Improvement of the memory allocation algorithm for evaluating query language expressions in the relational database handler CANTOR
[FOA-C-20508-D8] N84-17916
Empirical studies of program behaviour in virtual memory
[PB84-112267] N84-17921

COMPUTER SYSTEMS PROGRAMS
Traffic routing in a switched regenerative satellite. Volume 1, task 3: Traffic assignment
[ESA-CR(P)-1792-VOL-1] N84-17463
Traffic routing in a switched regenerative satellite. Volume 2, task 4: Review (executive summary)
[ESA-CR(P)-1792-VOL-2] N84-17464
Development of a computer program for road detection in satellite images
[FOA-C-30316-E1] N84-17917
Journal on Numerical Methods and Computer Applications (selected articles)
[AD-A134752] N84-17967

COMPUTER SYSTEMS SIMULATION
Constraint driven synthesis of hardware design N84-17870
Computer Science and Technology: Proceedings of the 19th Meeting of the Computer Performance Evaluation Users Group (CPEUG)
[PB84-114529] N84-17892

COMPUTER TECHNIQUES
Journal on Numerical Methods and Computer Applications (selected articles)
[AD-A134752] N84-17967
Machine models, computational complexity and number theory N84-17991
Computational methods in number theory, part 2
[MATH-CENTRE-TRACTS-155-PT-2] N84-17999
The computation of Galois groups N84-18000
Class numbers and units N84-18001
Multi-dimensional continued fraction algorithms N84-18003
Diophantine equations N84-18004
Numerical computation of special zeros of partial sums of Riemann's zeta function N84-18005
The first 200,000,001 zeros of Riemann's zeta function N84-18006
A program for developing automated scientific-information processing in maritime economy
[AD-A135518] N84-18107

COMPUTER VISION
Design and prototype implementation of SCAN: A programming language for scene analysis N84-17893

COMPUTERIZED SIMULATION
Path discrepancies between great circle and rhumb line
[NASA-TM-85522] N84-17168
FM spectral modeling and FDM/FM simulation programs
[PB84-118934] N84-17469
Radially resolved simulation of a high-gain free electron laser amplifier
[DE84-003751] N84-17585
Advanced photovoltaic system simulator to demonstrate the performance of advanced photovoltaic cells and devices
[DE83-009405] N84-17688
Summary of earthquake intensity file: A computerized file of the effects of earthquakes in the United States
[PB84-101443] N84-17745
Preparing meteorological data for use in routine dispersion calculations: Workgroup summary
[PB84-119890] N84-17774
RADC (Rome Air Development Center) DDP (Distributed Data Processing) topology evaluation
[AD-A134701] N84-17909
A study of nucleation and growth of thin films by means of computer simulation: General features
[NASA-TM-83559] N84-17982
Numerical simulations of the NRL collective particle accelerator
[AD-A135533] N84-18028

COMPUTERS
Computer Science and Technology: Proceedings of the 19th Meeting of the Computer Performance Evaluation Users Group (CPEUG)
[PB84-114529] N84-17892

CONCENTRATION (COMPOSITION)
Technique for the rapid generation of OH radicals behind shock waves and its application to the study of combustion kinetics
[DE84-003183] N84-17317
The practical use of data as to the solution enthalpies of molten Fe-V-Si
[BLL-M-35430-(5828.4)] N84-17342
Effect of specimen size and nickel content on the impact properties of 12 Cr-1 MoVW ferritic steel
[DE84-003270] N84-17377
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolves Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
Sea salt aerosol, atmospheric radon and meteorological observations in the western South Atlantic Ocean (February 1981)
[AD-A134792] N84-17794
Fast diffusion of iron in single crystal rutile and iron doped rutile
[DE84-004021] N84-18079

CONCENTRATORS
Concentration of sulphuric acid: Premature failure of Bamag pots
[MRL-R-885] N84-17301
Linear Fresnel lens photovoltaic concentrator program
[DE84-002971] N84-17689
Electrochemical carbon dioxide concentrator subsystem development
[NASA-CR-166538] N84-17857

CONCRETE STRUCTURES
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635
Concrete tensile strength study
[PB84-101021] N84-17637

CONCRETES
Development of a high pressure water jet for the rapid removal of concrete
[PB84-109909] N84-17426
Evaluation of Chem-Crete high strength modified asphalt concentrate
[PB84-105089] N84-17636
Concrete tensile strength study
[PB84-101021] N84-17637
Nonlinear geometric, material and time dependent analysis of reinforced concrete shells with edge beams
[PB84-104454] N84-17639

CONDENSATES
Using the surface tension to estimate the condensate density of superfluid He-4
[DE83-011325] N84-18077

CONDENSING
Two-dimensional supersonic expansion flows on walls with nonequilibrium condensation N84-17125
Rules governing the distribution of a gas jet in a liquid. Communication 2
[BLL-M-35437-(5828.4)] N84-17513

Frontogenesis in a moist atmosphere
[PB84-104066] N84-17779

CONDUCTIVITY
Ionic conductivity of Li7BiO6
[AD-A135386] N84-17307

CONES
Correlations of supersonic boundary-layer transition on cones including effects of large axial variations in wind-tunnel noise
[NASA-TP-2229] N84-17534

CONFERENCES
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 1
[AD-A134833] N84-17154
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134834] N84-17155
Synopsis and recommendations of the TSC Workshop on differential operation of NAVSTAR GPS, June 1983
[PB84-121599] N84-17170
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
Spacecraft/plasma interactions and their influence on field and particle measurements --- conferences
[ESA-SP-198] N84-17253
Proceedings of the Air Force Geophysics Laboratory Workshop on Natural Charging of Large Space Structures in Near Earth Polar Orbit
[AD-A134894] N84-17281
International Conference on Recent Developments in Specialty Steels and Hard Materials N84-17348
Report of the 68th National Conference on Weights and Measures 1983
[PB84-110998] N84-17425
Proceedings of the Symposium on Military Space Communications and Operations
[AD-A135021] N84-17439
Specifications, tolerances, and other technical requirements for weighing and measuring devices
[PB84-125764] N84-17572
Mini-Seminar on Quality Assurance
[CSIR-TSD-0008/82] N84-17600
Remote sensing: New satellite systems and potential applications --- conferences
[ESA-SP-205] N84-17650
Report from the URSI Commission F Symposium on Wave Propagation and Remote Sensing
[FOA-C-30340-E2] N84-17682
Proceedings of the 18th International Conference on Coastal Engineering
[ISBN-0-7988-2553-7] N84-17783
West breakwater, Sines (Portugal) --- conferences N84-17785
Computer Science and Technology: Proceedings of the 19th Meeting of the Computer Performance Evaluation Users Group (CPEUG)
[PB84-114529] N84-17892
Proceedings of the Conference on Joint Problem Solving and Microcomputers
[AD-A135001] N84-17901
International Conference on Stiff Computation
[AD-A135265] N84-17956
New horizons in electromagnetic physics
[DE84-002600] N84-18039

CONGRESSIONAL REPORTS
Airport and aircraft safety research and technology
[GPO-26-497] N84-17152
Semiannual report to Congress on the effectiveness of the civil aviation security program
[AD-A134860] N84-17156
Satellite-directed navigational guidance for aircraft
[H-REPT-98-510] N84-17164
Review of materials processing in space, 1983
[GPO-27-914] N84-17193
Space commercialization
[GPO-26-498] N84-17194
Transfer of civil meteorological satellites
[H-REPT-98-509] N84-17238
Alternative fuels for general aviation
[GPO-27-618] N84-17409
Providing comprehensive national policy dealing with national needs and objectives in the Arctic and national materials policy
[H-REPT-98-593] N84-17640
A 1983 science and technology posture hearing with Director, Office of Science and Technology Policy
[GPO-21-095] N84-18085
Research and development joint ventures
[GPO-26-312] N84-18114
Joint industry/university cooperation with federally supported research facilities
[GPO-24-902] N84-18115
National Aeronautics and Space Administration Act, 1985 N84-18116

CONICAL FLOW
The COREL and W12SC3 computer programs for supersonic wing design and analysis
[NASA-CR-3676] N84-17130

CONJUGATES
A multigrid method and a combined multigrid-conjugate gradient method for elliptic problems with strongly discontinuous coefficients in general domains
[PUBL-604-REV.] N84-17980

CONJUNCTIVA
Investigation of the microcirculation of the conjunctiva in airmen with the initial symptoms of cerebral atherosclerosis N84-17818

CONSERVATION LAWS
Deterministic chaos in materials exhibiting phase transitions
[AD-A135172] N84-17537
Accuracy of stable schemes for 2D scalar conservation laws
[DE84-004989] N84-17976

CONSISTENCY
Notions of dependency satisfaction
[AD-A135303] N84-17902
Tests for preference
[MATH-CENTRE-TRACTS-162] N84-17939

CONSTRAINTS
Constraint driven synthesis of hardware design N84-17870

CONSTRUCTION
Thermal and electric energy and desalination with a salt gradient solar pond
[DE84-900416] N84-17691

CONTINUOUS WAVE LASERS
Modeling study of a CW HF resonance transfer laser medium
[AD-A134866] N84-17580
Distance measurement to line of sight obstacles close to roads, a commission from Statens Vaeg och Trafikinstitute (VTI) --- distance measuring with a continuous wave laser
[FOA-C-30333-E1] N84-17586

CONTRACT MANAGEMENT
Lessons learned--advanced attack helicopter
[AD-A135521] N84-17177
A strategy for improving overhead cost control
[AD-A134661] N84-18092

CONTROL
The effects of the space environment on damping materials and damping designs on flexible structures N84-17217

CONTROL EQUIPMENT
A deployable structure and solar array controls experiment for STEP N84-17227

CONTROL STICKS
Crashworthy cyclic control stick
[AD-A135150] N84-17176

CONTROL THEORY
Control theory of hyperbolic systems
[AD-A135146] N84-17952

CONTROLLERS
Selection of noisy sensors and actuators for regulation of linear systems --- large space structures
[AD-A135442] N84-17931

CONVECTIVE FLOW
Baroclinic inertial instability in the non-static equilibrium atmosphere
[BLL-TRANS-1568-(9022.552)] N84-17751

CONVECTIVE HEAT TRANSFER
Finite analytic numerical solutions of laminar and turbulent convective heat transfer for pipe flow past a cavity N84-17515

CONVERGENCE
Estimation techniques for transport equations
[AD-A135092] N84-17945
Estimation of temporally and spatially varying coefficients in models for insect dispersal
[AD-A135093] N84-17946
Convergence of quadratic forms in p-stable random variables and theta sub p-radonifying operators
[AD-A135314] N84-17959

CONVERTERS
Test Operations Procedure: Signal converters
[AD-A134615] N84-17446

CONVEXITY
Conformal solution methods based on the hard convex body expansion theory, section 1
[PB84-100940] N84-17332

COOLANTS
Development of a contact heat exchanger for a constructable radiator system
[NASA-CR-171730] N84-17523
Simulation of natural convection in a rectangular loop using finite elements
[DE84-003477] N84-17550
Ultra-high-field superconducting magnets
[DE84-003913] N84-18012

COOLING
Simulation of natural convection in a rectangular loop using finite elements
[DE84-003477] N84-17550

COORDINATES
Kinematics and dynamics of multi-rigid-body open-chain systems: Application to robot manipulators N84-17851

COPOLYMERS
Deposition of polymer films on metal by the electrolysis of aqueous solutions of vinyl monomers
[BLL-LTS-1200/83-(5828.4F)] N84-17386
Mass spectrometric decomposition studies on several azido and nitrato polymers, thermal plasticizers and novel nitramines
[AD-A134636] N84-17398

COPPER
Synthesis and characterization of binuclear Schiff base complexes of nickel, copper, and manganese
[AD-A135493] N84-17360
Eddy current thickness gauge for reel-to-reel tape processes
[DE84-004050] N84-17567

COPPER ALLOYS
Constitution diagram of system vanadium - copper
[AD-A135516] N84-17361
Modification of alloy surface composition by segregation processes as a means of impurity control in fusion devices
[DE84-003645] N84-17373
Study of ion bombardment-induced subsurface compositional modifications in Ni-Cu alloys at elevated temperatures by ion scattering spectroscopy
[DE84-003632] N84-17380

COPPER OXIDES
Diffusion mechanisms in transition-metal oxides
[DE84-003460] N84-18081

CORNER FLOW
Stability of the laminar boundary layer in a streamwise corner
[NASA-CR-173282] N84-17532

CORRELATORS
Correlative phase modulation for fixed satellite services, volume 1 (phase 1)
[PTI-SB-2363-21-3505-VOL-1] N84-17465
Correlative phase modulation for fixed satellite service-s. Volume 2: Supplementary report
[PTI-SB-2363-21-3794-VOL-2] N84-17466

CORROSION
Concentration of sulphuric acid: Premature failure of Bamag pots
[MRL-R-885] N84-17301

CORROSION RESISTANCE
Structural and electrochemical properties of platinum-titanium laser surface alloys N84-17346

COSMIC RAYS
Effects of space radiation on advanced semiconductor devices. Part 1: A review of current theories and practice in cosmic ray simulation
[G-2532-VOL-1] N84-17505
Effects of space radiation on advanced semiconductor devices. Part 2: Cosmic ray simulation experiments for the study of single event upsets in CMOS technology
[G-2745-VOL-2] N84-17506
Power spectral signatures of interplanetary corotating and transient flows
[NASA-TM-86051] N84-18131
The cosmic ray energy spectrum from 2 x 10-17 to 10-e-19 EV N84-18146
Interplanetary flow systems associated with cosmic ray modulation in 1977 - 1980
[NASA-TM-85120] N84-18149
Rapporteur paper for sessions MG1, MG3 and MG4: Modulation theory, interplanetary propagation and interplanetary acceleration
[NASA-TM-86047] N84-18150
A study of the diffuse galactic gamma radiation
[NASA-TM-86055] N84-18151

COSMIC X RAYS
High resolution X- and gamma-ray spectroscopy of cosmic X-ray sources
[NASA-CR-175368] N84-18148

COSMOCHEMISTRY
High pressure cosmochemistry applied to major planetary interiors: Experimental studies --- phase diagram for the ammonia water system
[NASA-CR-173278] N84-18138

COSMOLOGY
Milgrom's revision of cosmic dynamics: Amending Newton's laws or Keplers?
[NASA TM-86049] N84-18132

COST EFFECTIVENESS
Feasibility assessment of JOVIAL to Ada translation
[AD-A134857] N84-17911
A strategy for improving overhead cost control
[AD-A134661] N84-18092

COST ESTIMATES
Estimating the cost of composite material airframes using the Rand Corporation Development and Procurement Costs of Aircraft parametric model (DAPCA III)
[AD-A134983] N84-17120
Development of a solar energy system
[DE83-014236] N84-17690
Development of a solar energy system: Executive summary
[DE83-014392] N84-17693

COULOMB POTENTIAL
Progress in numerical calculations of ion-atom collisions
[DE84-003405] N84-18033

COVARIANCE
Asymptotic properties of extended Yule-Walker estimates of the AR parameters of an ARMA (autoregressive moving-average)
[AD-A134981] N84-17970

COVERINGS
Development or a solar cell coverglass adhesive for space application
[BMFT-FB-W-83-029] N84-17695

CRAB NEBULA
Stellar Ultraviolet Rocket Research Program — faint object spectrograph
[NASA-CR-175361] N84-18119

CRACK CLOSURE
Three-dimensional measurements of fatigue crack closure
[NASA-CR-175366] N84-17616

CRACK GEOMETRY
Plane stress crack-line fields for crack growth in an elastic perfectly-plastic material
[AD-A134868] N84-17630

CRACK INITIATION
Microstructural and mechanical aspects of fatigue crack initiation and growth in a 2048 aluminum alloy N84-17347

CRACK PROPAGATION
Disclinations in carbon-carbon composites
[AD-A135246] N84-17295
Microstructural and mechanical aspects of fatigue crack initiation and growth in a 2048 aluminum alloy N84-17347
An evaluation of overload retardation behavior and overload retardation models of Ti-6Al-4V sheet titanium alloy
[AD-A135548] N84-17362
Crack propagation in polystyrene under fixed elongation
[AD-A134749] N84-17399
Tie molecules in polyethylene
[PB84-101435] N84-17405
Recommendations for future research on fracture mechanics life technology
[NASA-CR-170904] N84-17615
A review of fracture mechanics life technology — linear elastic fracture mechanics
[NASA-CR-170903] N84-17622
Use of small crack data to bring about and quantify improvements to aircraft structural integrity
[AD-A135012] N84-17623
Fracture and contact problems for linearly viscoelastic material
[AD-A135111] N84-17624
Plane stress crack-line fields for crack growth in an elastic perfectly-plastic material
[AD-A134868] N84-17630
Subsidence monitoring for state of Arizona
[PB84-126960] N84-17750
La Recherche Aerospatiale, bimonthly bulletin number 1983-2, 213/March-April
[ESA-TT-817] N84-18013

CRACKING (FRACTURING)
A cylindrical shell with a stress-free end which contains an axial part-through or through crack
[NASA-CR-173290] N84-17617
Transient thermal stresses in a reinforced hollow disk or cylinder containing a radial crack
[NASA-CR-173292] N84-17619

CRACKS
Three-dimensional measurements of fatigue crack closure
[NASA-CR-175366] N84-17616
Transient thermal stresses in a reinforced hollow disk or cylinder containing a radial crack
[NASA-CR-173292] N84-17619
A functional stress intensity approach to multiply cracked, partially autofrettaged cylinders
[AD-A135345] N84-17625

CRASH LANDING
Computer modeling of aircraft cabin fires
[PB84-101153] N84-17162

CRASHWORTHINESS
Developments in cabin safety and crashworthiness — passenger aircraft N84-17161
Crashworthy cyclic control stick
[AD-A135150] N84-17176

CREEP PROPERTIES
Factors which influence directional coarsening of Gamma prime during creep in nickel-base superalloy single crystals
[NASA-TM-83595] N84-17353
Influence of composition on the microstructure and mechanical properties of a nickel-base superalloy single crystal
[NASA-TM-83563] N84-17354

CRITICAL TEMPERATURE
The concepts of critical temperature and energy cutoff of ambient electrons in high voltage charging of spacecraft N84-17275

CROP INVENTORIES
Land use inventory and statistical sampling in agriculture — spaceborne remote sensing N84-17658

CROSS FLOW
Turbulence measurements in plane jets and plumes in crossflow
[PB84-105303] N84-17554
Photon-burst correlation techniques for atmospheric crosswind measurements
[AD-A134617] N84-17735

CRUISING FLIGHT
Helicopter rotor wake geometry and its influence in forward flight. Volume 1: Generalized wake geometry and wake effect on rotor airloads and performance
[NASA-CR-3726] N84-17149

CRYOGENICS
Acoustic microscopy at cryogenic temperatures
[AD-A135089] N84-17421

CRYPTOGRAPHY
On a secure public-key cryptosystem N84-17997

CRYSTAL DEFECTS
Metallic microwave conductivity in shock-loaded rutile
[DE84-002174] N84-18075

CRYSTAL DISLOCATIONS
A study on the tensile strength of ice as a function of grain size
[AD-A134889] N84-17631

CRYSTAL GROWTH
Homogeneity and magnetic susceptibility in some substituted cadmium spinels
[AD-A135297] N84-17357
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 1: Executive summary
[ERC-RP-200-DS-009-VOL-1] N84-17423
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 2: Technical descriptions
[ERC-RP-200-DS-009-VOL-2] N84-17424
Thermocapillary flows and their stability: Effects of surface layers and combination
[NASA-CR-170962] N84-17522
Growth and evaluation of AgGaS2 and AgGaSe2 for infrared nonlinear applications
[NASA-CR-175185] N84-18066

CRYSTAL LATTICES
Model compound studies of rigid rod aromatic heterocyclic polymer systems, the X-ray crystal structure of 2,6-diphenylbenzo (1,2-d; 5,4-d') diimidazole tetrahydrate, C2OH14N4. 4H2O, a model system for the study of polymer-water interaction in polybenzimidazoles
[AD-A135278] N84-17393

CRYSTAL OSCILLATORS
Rubidium frequency standard study
[AD-A134713] N84-17492

CRYSTAL STRUCTURE
Angle-resolved photoemission extended fine structure
[DE84-002899] N84-18080

CUES
Visual cues in the simulation of low-level flight
[AD-A135461] N84-17839

CURVATURE
An analytical study of cylindrical- and spherical-rectangular microstrip antennas N84-17428
Intrinsic adaptive mesh techniques
[NASA-CR-175375] N84-17941

CUTTERS
Aspects of the grinding process
[CSIR-TRANS-1694] N84-17416

CYANIDES
Journal of Research of the National Bureau of Standards. Volume 88, Number 3, May-June 1983
[PB84-115799] N84-17328

CYCLES
Crossed molecular beam studies of the reactions of oxygen and fluorine atoms
[AD-A135415] N84-17309

CYCLIC LOADS
Recommendations for future research on fracture mechanics life technology
[NASA-CR-170904] N84-17615

CYCLOTRON RESONANCE
Interaction of electromagnetic fields with plasma
[AD-A135173] N84-18054

CYLINDRICAL ANTENNAS
An analytical study of cylindrical- and spherical-rectangular microstrip antennas N84-17428

CYLINDRICAL BODIES
Numerical computation of steady state scattered sound external to submerged infinite cylinders by combining finite element and integral equation methods
[AD-A134773] N84-18020

CYLINDRICAL CHAMBERS
Finite analytic numerical solutions of laminar and turbulent convective heat transfer for pipe flow past a cavity N84-17515

CYLINDRICAL SHELLS
A cylindrical shell with a stress-free end which contains an axial part-through or through crack
[NASA-CR-173290] N84-17617
A pressurized cylindrical shell with a fixed end which contains an axial part-through or through crack
[NASA-CR-173291] N84-17618
Transient thermal stresses in a reinforced hollow disk or cylinder containing a radial crack
[NASA-CR-173292] N84-17619
A functional stress intensity approach to multiply cracked, partially autofrettaged cylinders
[AD-A135345] N84-17625

D

DAMPING
Torsional ultrasonic technique for reactor vessel liquid level measurement
[DE84-003357] N84-18024
A study of waves on a curved space-time N84-18083

DATA ACQUISITION
Data acquisition for evaluation of an airborne lightning detection system
[AD-A135318] N84-17153
Airloads research study. Volume 1: Flight test loads acquisition
[NASA-CR-170409] N84-17173
Study of a pulse width modulated, telemetered, microprocessor based data acquisition system N84-17247
Incident velocity distributions on sampling electrodes of spacecraft plasma instruments N84-17267
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773
Preparing meteorological data for use in routine dispersion calculations: Workgroup summary
[PB84-119890] N84-17774
NODC (National Oceanographic Data Center) inventory of XBT data along transects in U.S. Atlantic and Gulf coastal waters from NMFS/MARD ship of opportunity program for 1981
[PB84-122662] N84-17802
Proposed National Technical Information Service revolving fund
[PB84-103076] N84-18097

DATA BASE MANAGEMENT SYSTEMS
Application of hierarchical data structures to geographical information systems
[AD-A134999] N84-17670
Improvement of the memory allocation algorithm for evaluating query language expressions in the relational database handler CANTOR
[FOA-C-20508-D8] N84-17916
Multidomain, multirecord-type Datatrieve-11 databases
[DE84-001707] N84-18110

DATA BASES
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134834] N84-17155
On acyclic database decompositions
[AD-A135105] N84-17887
Notions of dependency satisfaction
[AD-A135303] N84-17902
Hexagonal data base study
[AD-A135532] N84-17907
Query processing and data allocation in distributed database systems
[MATH-CENTRE-TRACTS-156] N84-18101
Automated data base implementation requirements for the avionics planning baseline, Army
[AD-A135259] N84-18103
Multidomain, multirecord-type Datatrieve-11 databases
[DE84-001707] N84-18110

DATA MANAGEMENT
Typical remote sensing data products N84-17656
Hexagonal data base study
[AD-A135532] N84-17907
DATA PROCESSING
Investigation of design considerations for a complex demodulation filter
[NASA-CR-173295] N84-17195
An Attached Payload Operations Center (APOC) at the Goddard Space Flight Center (GSFC), volume 2
[NASA-CR-175160-VOL-2] N84-17203
Statistical data processing, system modeling and reliability
[AD-A135208] N84-17984
Meeting the automatic data processing and telecommunications needs of the federal government: A five-year plan
[PB83-195255] N84-18111
DATA PROCESSING EQUIPMENT
Acquisition systems for heat transfer measurement
[DE84-003779] N84-17551
Automated synthesis of digital hardware modules: Simulation and verification of interconnections
[AD-A135298] N84-17889
DATA PROCESSING TERMINALS
Test Operations Procedure (TOP): Data transmission equipment
[AD-A134711] N84-17449
DATA REDUCTION
Manual of analytical methods for radiobioassay
[DE84-003978] N84-17318
Investigations of Doppler position determination following the short arc and semi short arc techniques --- Navy navigation satellite systems N84-17645
DATA SAMPLING
Incident velocity distributions on sampling electrodes of spacecraft plasma instruments N84-17267
Sampling mismatch and timing jitter in pulse-Doppler radar
[AD-A134683] N84-17447
Land use inventory and statistical sampling in agriculture --- spaceborne remote sensing N84-17658
DATA STRUCTURES
Automated synthesis of digital hardware modules: Simulation and verification of interconnections
[AD-A135298] N84-17889
Automatic synthesis of abstract data type implementations from abstract specifications N84-17896
DATA TRANSMISSION
Test Operations Procedure (TOP): Data transmission equipment
[AD-A134711] N84-17449
Microfiche Image Transmission System (MITS) demonstration field evaluation of microfacsimile
[AD-A134716] N84-17450
DEATH
Civilian residential fire fatality rates: Six high-rate states versus six low-rate states
[PB84-102615] N84-17427
DECELERATION
IRAAM wind tunnel test, task 3
[AD-A135256] N84-17148
DECISION MAKING
Knowledge representation and natural-language semantics
[AD-A135476] N84-17905
Mutual adaptiveness of man and machine in information acquisition tasks
[AD-A135449] N84-17932
Search algorithms and their implementation
[AD-A135154] N84-17953
A method of measurement of behavioral factors affecting information systems design and use: An application of multidimensional scaling in uncovering individual psychological structure N84-18099
DECISION THEORY
Markov decision processes with continuous time parameter
[MATH-CENTRE-TRACTS-164] N84-17940
Preserving asymmetry by symmetric processes and distributed fair conflict resolution
[AD-A135458] N84-17986
DECODING
Investigation of encryptation for satellite communications
[FOA-C-30300-E1] N84-17457
DECOMPOSITION
On acyclic database decompositions
[AD-A135105] N84-17887
Eisenstein series on the metaplectic group: An algebraic approach
[MATH-CENTRE-TRACTS-161] N84-17937
DEFECTS
Correlation of yield stress changes in 316 stainless steel irradiated with high-energy and fission neutrons
[DE84-002115] N84-17368
DEFENSE PROGRAM
The national space program from the fifties into the eighties
[AD-A134799] N84-17197
Implications of joint NASA/DOD participation in Space Shuttle operations
[PB84-122472] N84-17286
DEFORESTATION
Test of the use of LANDSAT imagery to detect changes in the area of forest in the tropics
[DE84-004444] N84-17680
DEFORMATION
Multi-transition stamping of components with thin body and tall stiffening ribs
[BLL-M-35384-(5828.4)] N84-17415
Embedded gage impact study
[NASA-CR-172227] N84-17558
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 1
[AD-A135387] N84-17626
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 2
[AD-A135388] N84-17627
DEMODULATION
Investigation of design considerations for a complex demodulation filter
[NASA-CR-173295] N84-17195
DEMOGRAPHY
Estimation of small area populatons using remote sensing and other approaches
[DE84-003404] N84-17678
DENSIFICATION
Dynamic consolidation of ceramic powders: Practicalities, problems, and prospects
[DE84-003744] N84-17404
DENSIMETERS
National Bureau of Standards Journal of Research, volume 88, no. 4, July - August 1983
[PB84-115849] N84-17571
DENSITY (MASS/VOLUME)
Consolidation of Si3N4 without additives (by hot isostatic pressing)
[NASA-CR-173279] N84-17389
DENSITY DISTRIBUTION
Maximum entropy reconstruction of a volume anomaly from pulse scatter data
[DE84-002463] N84-18084
DEPENDENCE
Notions of dependency satisfaction
[AD-A135303] N84-17902
DEPLOYMENT
The STEP/STACBEAM experiment technology development for very large solar array deployers N84-17220
Low concentration ratio solar array structural configuration N84-17225
Development of Test Article Building Block (TABB) for deployable platform systems N84-17226
DEPOSITION
Process and cell arrangement for producing difficult to reduce elements by fused salt electrolysis
[BLL-OA-TRANS-3137-(6196.3)] N84-17339
Ion deposited carbon coatings
[AD-A135068] N84-17390
Atmospheric deposition to forests
[DE84-003384] N84-17700
Estimation of North America anthropogenic sulfur deposition as a function of source/receptor separation
[DE84-003638] N84-17701
DEPOSITS
Emission FTIR analyses of thin microscopic patches of jet fuel residue deposited on heated metal surface
[NASA-CR-168331] N84-17410
DESCENT TRAJECTORIES
IRAAM wind tunnel test, task 3
[AD-A135256] N84-17148
DESIGN
Multi-transition stamping of components with thin body and tall stiffening ribs
[BLL-M-35384-(5828.4)] N84-17415
DESIGN ANALYSIS
Shape optimal design and free boundary value problems N84-17516
Constraint driven synthesis of hardware design N84-17870
SP-100 program: Space reactor system and subsystem investigations
[DE84-003217] N84-18045
Fusion reactors: Physics and technology
[DE83-017148] N84-18055
Circular waveguide systems for electron-cyclotron-resonant heating of the tandem mirror experiment-upgrade
[DE84-003739] N84-18062
DESORPTION
Comparison of photon stimulated dissociation of gas phase, solid and chemisorbed water
[AD-A134986] N84-17314
DIAGNOSIS
Approach to real-time holography
[DE84-002779] N84-17565
DIAMONDS
Wheel efficiency in the diamond-spark erosion grinding of tungsten carbides
[CSIR-TRANS-1693] N84-17418
Dressing methods for grinding wheels made of superhard abrasive materials
[CSIR-TRANS-1700] N84-17419
On the use of diamond and cubical boron nitride abrasives in automatic honing applications
[CSIR-TRANS-1640] N84-17420
DIELECTRIC PROPERTIES
Microwave dielectric constant dependence on soil tension
[AD-A134651] N84-17673
DIELECTRICS
National Bureau of Standards Journal of Research, volume 88, no. 4, July - August 1983
[PB84-115849] N84-17571
Insulator materials in high power lasers for inertial fusion: Present and future
[DE84-003738] N84-18063
DIESEL ENGINES
Apparatus and method for destructive removal of particles contained in flowing fluid
[NASA-CASE-NPO-15426-1] N84-17555
Diesel fuel extenders and substitutes
[DE84-003402] N84-17597
Exhaust emissions from a diesel engine
[PB84-122910] N84-17713
Effects of diesel vehicles on visibility in California
[PB84-122167] N84-17714
DIESEL FUELS
Diesel fuel extenders and substitutes
[DE84-003402] N84-17597
Effects of diesel vehicles on visibility in California
[PB84-122167] N84-17714
DIFFERENTIAL EQUATIONS
Temporal finite elements based on a minimum principle for initial value problems N84-17935
Nonlinear resonance
[AD-A135117] N84-17950
International Conference on Stiff Computation
[AD-A135265] N84-17956
Numerical methods for singular perturbation problems
[AD-A134696] N84-17966
Matrix-free methods in the solution of stiff systems of ODE's
[DE84-003361] N84-17974
Automatic adaptive grid refinement for the Euler equations
[NASA-CR-173161] N84-17977
Algorithm for the detection and integration of highly oscillatory ordinary differential equations using a generalized unified modifiec divided difference representation
[DE84-003585] N84-17978
DIFFRACTION PATTERNS
Contributions to the theory of quantum 1/f noise N84-18082
DIFFUSE RADIATION
Limits on diffuse X-ray emission from M101
[NASA-CR-173277] N84-18147
A study of the diffuse galactic gamma radiation
[NASA-TM-86055] N84-18151
DIFFUSERS
Characteristics of a four nozzle, slotted mixing stack with slanted shroud, gas eductor system
[AD-A134794] N84-17547
DIFFUSION
Vacuum ionic carburisation
[BLL-OA-TRANS-3149-(6196.3)] N84-17291
Study of ion bombardment-induced subsurface compositional modifications in Ni-Cu alloys at elevated temperatures by ion scattering spectroscopy
[DE84-003632] N84-17380
Estimation techniques for transport equations
[AD-A135092] N84-17945
Fast diffusion of iron in single crystal rutile and iron doped rutile
[DE84-004021] N84-18079
DIFFUSION FLAMES
Prediction of an apparent flame length in a co-axial jet diffusion flame combustor
[AD-A135088] N84-17303

Structure, inhibition and extinction of polymer diffusion flames
[PB84-101336] N84-17327

DIFFUSIVITY
Transport of water in frozen soil. I: Experimental determination of soil-water diffusivity under isothermal conditions
[AD-A135419] N84-17671

DIGITAL DATA
APQ-102 imaging radar digital image quality study
[NASA-CR-171738] N84-17435
Jam-resistant speech encoding
[AD-A134707] N84-17448
TIGS (table plot interactive graphics system)--an interactive graphical system for the creation and correction of tabular data sets
[AD-A135522] N84-17906
A model for ordinal filtering of digital images
[AD-A134705] N84-18052

DIGITAL FILTERS
Investigation of design considerations for a complex demodulation filter
[NASA-CR-173295] N84-17195

DIGITAL SIMULATION
NASCAP simulations of spacecraft charging of the SCATHA satellite — NASA (spacecraft) charging analyzer program (NASCAP) N84-17268

DIGITAL SPACECRAFT TELEVISION
Digital sound service for direct broadcasting satellites N84-17462

DIGITAL SYSTEMS
Cumulative phase modulation for fixed satellite service-s. Volume 2: Supplementary report
[PTI-SB-2363-21-3794-VOL-2] N84-17466
Design and complexity of VLSI algorithms N84-17876
INTAC: Digital and analog circuit test language
[INPE-2764-PRE/338] N84-17898

DIGITAL TECHNIQUES
Use of digitized radar and microcomputers to forecast local floods and irrigation needs
[PB84-105568] N84-17767

DIGITAL TO ANALOG CONVERTERS
An airborne programmable digital to video converter
[AD-A134839] N84-17181

DIMETHYLHYDRAZINES
Measurements of hypergolic fuels' and oxidants' permeation through commercial protective materials: Part 1. Inhibited red fuming nitric acid and unsymmetrical dimethylhydrazine
[AD-A134714] N84-17411

DIOPHANTINE EQUATION
Diophantine equations N84-18004

DIRECT CURRENT
Probe measurement of DC electric fields — SCATHA satellite charging N84-17255
The DC electric field in space: Direct measurements and inferences from cold plasma drifts N84-17264
Studies of electrically stimulated rat limb and peripheral nerve regeneration
[AD-A134358] N84-17806

DIRICHLET PROBLEM
Applications of Non-Self-Adjoint operator theory to the Singularity Expansion Method (SEM) and to the Eigenmode Expansion Method (EEM) in acoustic and electromagnetic problems
[AD-A135177] N84-17955

DISCONTINUITY
Magnetic field reconnection at the magnetopause: An overview N84-17719
Beam front accelerators
[DE84-003709] N84-18032

DISEASES
Military Medical Journal, no. 3, 1983
[L-2399] N84-17817

DISKS
Probabilistic planning and budgeting for R and D programs involving activities of high uncertainty
[DE84-002310] N84-18093

DISKS (SHAPES)
Transient thermal stresses in a reinforced hollow disk or cylinder containing a radial crack
[NASA-CR-173292] N84-17619

DISPERSING
Dispersion experiments with sulfur hexafluoride from the 213m high meteorological mast at Cabauw in the Netherlands N84-17706

DISPERSIONS
Preparing meteorological data for use in routine dispersion calculations: Workgroup summary
[PB84-119890] N84-17774

DISPLACEMENT
A new approach to polymer chemistry: Organometallic and bioactive phosphazenes
[AD-A135429] N84-17396
A finite difference scheme for the equilibrium equations of elastic bodies
[NASA-CR-172293] N84-17621

DISPLAY DEVICES
CDTI target selection criteria
[NASA-CR-3776] N84-17178
Instructor station display for use in T-37 flight simulation training
[AD-A134854] N84-17191
Visual cues in the simulation of low-level flight
[AD-A135461] N84-17839
EASAMS architecture for management and control systems N84-17871
Quantification of interference and detectability properties of visual stimuli for optimal display design
[AD-A135438] N84-18049

DISTANCE
The use of burst transmission to increase communication range: A feasibility study
[PB84-111400] N84-17467

DISTANCE MEASURING EQUIPMENT
Distance measurement to line of sight obstacles close to roads, a commission from Statens Vaeg och Trafikinstitute (VTI) — distance measuring with a continuous wave laser
[FOA-C-30333-E1] N84-17586
An optical proximity sensor for measuring surface position and orientation for robot manipulation
[AD-A134899] N84-17861

DISTORTION
Adaptive feedforward linear wideband HF power bank
[AD-A134744] N84-17493

DISTRIBUTED PARAMETER SYSTEMS
Control theory of hyperbolic systems
[AD-A135146] N84-17952

DISTRIBUTED PROCESSING
Foundations of computer science 4. Distributed systems. Part 1: Algorithms and complexity
[MATH-CENTRE-TRACTS-158-PT-1] N84-17873
Distributed computing N84-17874
A distributed procedure to detect and/or deadlock
[AD-A135459] N84-17904
RADC (Rome Air Development Center) DDP (Distributed Data Processing) topology evaluation
[AD-A134701] N84-17909
Model and analysis of a communication interface with distributed processing for application in a communication network by packet switching
[INPE-2773-TDL/136] N84-17926
Computer networks without a shared memory AFOSR-81-0197
[AD-A135074] N84-17927
Preserving asymmetry by symmetric processes and distributed fair conflict resolution
[AD-A135458] N84-17986
Query processing and data allocation in distributed database systems
[MATH-CENTRE-TRACTS-156] N84-18101
Distributed algorithms for various problems
[AD-A135452] N84-18105

DISTRIBUTION FUNCTIONS
A Bayesian explanation of an apparent failure rate paradox
[AD-A134748] N84-17987

DITCHES
Statistical aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea
[AD-A134428] N84-17798

DIURNAL VARIATIONS
A dawn to dusk electric field in the Jovian magnetosphere
[NASA-CR-166463] N84-18136

DIVIDING (MATHEMATICS)
Fast arithmetic operations on numbers and polynomials N84-17992

DOCUMENTATION
Further delineation of the utilization of scientific literature by U.S. patents. Appendices A: Distribution of references contained in patents to various sources
[PB84-100742] N84-18096

DOMAINS
The fairness problem and nondeterministic computing networks N84-17883

DOPED CRYSTALS
Elementary excitations in semiconductor superlattices structures N84-18065
Fast diffusion of iron in single crystal rutile and iron doped rutile
[DE84-004021] N84-18079

DOPPLER EFFECT
Doppler lidar signal and turbulence study
[NASA-CR-170976] N84-17574

DOPPLER RADAR
Sampling mismatch and timing jitter in pulse-Doppler radar
[AD-A134683] N84-17447
Reports on cartography and geodesy, series 1: Original reports, number 90
[ISSN-0469-4236] N84-17643
Investigations of Doppler position determination following the short arc and semi short arc techniques --- Navy navigation satellite systems N84-17645
Results of permanent Doppler measurements at the satellite observation station Wettzell N84-17646
Calibration measurements of Doppler receivers --- satellite Doppler positioning N84-17647
Results of the simultaneous Doppler measuring campaign HOTDOC from 29 September to 10 October 1979 N84-17648

DRAG REDUCTION
Wave drag as the objective function in transonic fighter wing optimization
[NASA-TP-2265] N84-17127

DRINKING
Heat pump units with electrically driven compressors for water heating
[BLL-OA-TRANS-3181-(6196.3)] N84-17514

DROP SIZE
Climatological coefficients for rain attenuation at millimeter wavelengths
[PB84-104272] N84-17475

DUCTILITY
Integrated evaluation of tensile strengths and ductility limits
[BLL-M-35452-(5828.4)] N84-17613

DUNES
Northeast Scotland coastal field guide and geographical essays
[AD-A134861] N84-17674

DYNAMIC CHARACTERISTICS
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-175380] N84-17171
Crossed molecular beam studies of the reactions of oxygen and fluorine atoms
[AD-A135415] N84-17309
Deterministic chaos in materials exhibiting phase transitions
[AD-A135172] N84-17537
Dynamic behavior of nonuniform tire/wheel assemblies
[PB84-125541] N84-17598
Investigation of ice dynamics in the marginal ice zone --- Arctic Ocean
[AD-A134599] N84-17799
Detection of abrupt changes in dynamic systems
[NASA-CR-173217] N84-17988

DYNAMIC CONTROL
A deployable structure and solar array controls experiment for STEP N84-17227

DYNAMIC MODELS
Mathematical modeling of the aerodynamic characteristics in flight dynamics
[NASA-TM-85880] N84-17141
Shock compaction of molybdenum powder
[NASA-CR-173154] N84-17369

DYNAMIC RESPONSE
Photovoltaic concentrator pointing dynamics and plasma interaction study N84-17224
Validation methods for mathematical models of flexible satellite dynamics
[ESA-CR-(P)-1794] N84-17241
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635

DYNAMIC STRUCTURAL ANALYSIS
The STEP/STACBEAM experiment technology development for very large solar array deployers N84-17220
General requirements for Shuttle flight experiments N84-17221
Validation methods for mathematical models of flexible satellite dynamics
[ESA-CR-(P)-1794] N84-17241
West breakwater-Sines (Portugal): New aspects of armor units N84-17789

DYNAMICS EXPLORER 1 SATELLITE
A potential control method for thermal plasma measurements on the DE-1 spacecraft N84-17276

E

EAR PROTECTORS
Impact response of an energy absorbing earcup
[AD-A134828] N84-17860

EARTH (PLANET)
Homogeneous magnitude system of the Eurasian continent: S and L waves
[PB84-101161] N84-17744

EARTH ATMOSPHERE
Analysis of longwave radiation for the Earth-atmosphere system
[NASA-CR-173155] N84-17437
EARTH CRUST
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738
EARTH MANTLE
Teleseismic array analysis of upper mantle compressional velocity structure
[NASA-CR-173285] N84-17723
EARTH MOVEMENTS
Earth strain measurements with the transportable laser ranging system: Field techniques and planning
[NASA-CR-175150] N84-17725
Strong motion effects due to seismic waves in dipping layers
[PB84-127919] N84-17747
EARTH OBSERVATIONS (FROM SPACE)
Technology needs of advanced Earth observation spacecraft
[NASA-CR-3698] N84-17248
EARTH RADIATION BUDGET EXPERIMENT
Analysis of longwave radiation for the Earth-atmosphere system
[NASA-CR-173155] N84-17437
EARTH TERMINALS
SPOT (French satellite) --- satellite and program overviews N84-17652
EARTHQUAKES
Homogeneous magnitude system of the Eurasian continent: S and L waves
[PB84-101161] N84-17744
Summary of earthquake intensity file: A computerized file of the effects of earthquakes in the United States
[PB84-101443] N84-17745
ECLIPSING BINARY STARS
Determination of individual temperatures and luminosities in eclipsing binary star systems
[AD-A134182] N84-18133
ECOLOGY
Extremely Low Frequency (ELF) communications system ecological monitoring program: Plan and summary of 1982 progress
[AD-A135482] N84-17445
ECONOMIC IMPACT
Chromium
[PB84-100882] N84-17385
ECONOMICS
Thermal and electric energy and desalination with a salt gradient solar pond
[DE84-900416] N84-17691
ECOSYSTEMS
Extremely Low Frequency (ELF) communications system ecological monitoring program: Plan and summary of 1982 progress
[AD-A135482] N84-17445
Air pollution effects on terrestrial ecosystems
[PB84-128313] N84-17712
EDDY VISCOSITY
Improved turbulence models based on large eddy simulation of homogeneous, incompressible turbulent flows
[NASA-CR-166541] N84-17528
EDGES
Image analysis with use of range information
[FOA-C-30335-E1] N84-17979
EDITING ROUTINES (COMPUTERS)
Advanced edit system
[AD-A134952] N84-17913
EDUCATION
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824
EFFICIENCY
Wheel efficiency in the diamond-spark erosion grinding of tungsten carbides
[CSIR-TRANS-1693] N84-17418
EFFLUENTS
Biochemical indicators of thermal stress: Selected genetic and physiological parameters
[PB84-100122] N84-17808
EIGENVALUES
IMAGES: A digital computer program for interactive modal analysis and gain estimation for eigensystem synthesis
[NASA-TM-85690] N84-17186
Shape optimal design and free boundary value problems N84-17516
EIGENVECTORS
IMAGES: A digital computer program for interactive modal analysis and gain estimation for eigensystem synthesis
[NASA-TM-85690] N84-17186
EINSTEIN EQUATIONS
Eisenstein series on the metaplectic group: An algebraic approach
[MATH-CENTRE-TRACTS-161] N84-17937
The celestial mechanics experiment (E 11) of HELIOS
[BMFT-FB-W-83-016] N84-18124
EJECTION SEATS
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 1
[AD-A134833] N84-17154
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134834] N84-17155
EJECTORS
Variable area ejector-diffuser model tests
[AD-A134843] N84-17182
ELASTIC BODIES
A finite difference scheme for the equilibrium equations of elastic bodies
[NASA-CR-172293] N84-17621
ELASTIC DEFORMATION
Adaptation of two-dimensional transonic analysis code, TSFOIL, for use in modeling adaptive wall test sections N84-18089
ELASTIC PROPERTIES
Comparison of the characteristics of graphites irradiated at 600 and 9000 deg C
[DE83-015695] N84-17297
A finite difference scheme for the equilibrium equations of elastic bodies
[NASA-CR-172293] N84-17621
A review of fracture mechanics life technology --- linear elastic fracture mechanics
[NASA-CR-170903] N84-17622
Technical theory of pneumatic beams --- inflated beams
[FOA-C-20504-E4] N84-17634
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635
Acoustic data and uncertainty in geotechnical site characterization offshore
[PB84-100908] N84-17801
Numerical solution of singular integral equations arising in mixed boundary value problems of elasticity
[AD-A134673] N84-17965
ELASTIC SCATTERING
Low energy neutrino physics
[DE84-002856] N84-18037
ELASTOHYDRODYNAMICS
The ball bearing as a rheological test device
[NASA-TM-83570] N84-17591
ELASTOSTATICS
Some topics in finite elasticity N84-17614
ELECTRIC ARCS
Thermal-energy transport from arc to rails in an arc-driven rail gun
[AD-A134991] N84-17499
ELECTRIC BATTERIES
Fundamental mathematical principles for electrochemical engineering
[DE84-002181] N84-17975
ELECTRIC BRIDGES
The 25 kW resonant dc/dc power converter
[NASA-CR-168273] N84-17481
ELECTRIC COILS
Calculating the magnetic field from a saddle-shaped coil without a ferromagnetic circuit
[AD-A134776] N84-18011
ELECTRIC CONDUCTORS
Characterization of high temperature electrically conducting oxides
[DE84-002887] N84-18076
ELECTRIC CURRENT
Human reactions to transient electric currents, volume 8
[PB84-112895] N84-17834
ELECTRIC DISCHARGES
Human reactions to transient electric currents, volume 8
[PB84-112895] N84-17834
ELECTRIC FIELDS
Spacecraft/plasma interactions and their influence on field and particle measurements --- conferences
[ESA-SP-198] N84-17253
The DC electric field in space: Direct measurements and inferences from cold plasma drifts N84-17264
Development of power system measurements
[PB84-109891] N84-17509
Crystal fields and second order magnetic hyperfine interactions in TmFe2Si2
[DE84-003622] N84-18078
A dawn to dusk electric field in the Jovian magnetosphere
[NASA-CR-166463] N84-18136
ELECTRIC GENERATORS
A mathematical model for the doubly-fed wound rotor generator, part 2
[NASA-TM-83581] N84-17479
ELECTRIC MOTORS
State-of-the-art of solid-state motor controllers. Part 4: Failure-rate and failure-mode data
[DE84-001022] N84-17502
Optimal electric drive control to suppress jerking
[BLL-M-35391-(5826.4)] N84-17589
Electrical-shock prevention. Volume 3: Fault protection for motion-drive equipment
[PB84-102961] N84-17867
ELECTRIC NETWORKS
Preliminary investigation of an electrical network model for ultrasonic scattering
[NASA-CR-3770] N84-17606
BERTHA: A versatile transmission line and circuit code
[AD-A135024] N84-17886
ELECTRIC POTENTIAL
Anomalously high potentials observed on ISEE
[NASA-CR-172791] N84-17252
Optimization of the parameters of the arc suppressing system of high-voltage apparatuses with a thyristor attachment
[BLL-OA-TRANS-3139-(6196.3)] N84-17476
Human reactions to transient electric currents, volume 8
[PB84-112895] N84-17834
Analysis of electrical accident prevention countermeasures
[PB84-102987] N84-17869
ELECTRIC POWER PLANTS
Biochemical indicators of thermal stress: Selected genetic and physiological parameters
[PB84-100122] N84-17808
ELECTRIC POWER TRANSMISSION
Preliminary investigation of an electrical network model for ultrasonic scattering
[NASA-CR-3770] N84-17606
ELECTRIC PROPULSION
Thermal-energy transport from arc to rails in an arc-driven rail gun
[AD-A134991] N84-17499
ELECTRIC RELAYS
Electrical-shock prevention. Volume 1: Protection of maintenance personnel
[PB84-102946] N84-17865
ELECTRICAL ENGINEERING
Basic and applied research in the field of electronics and communications
[AD-A135283] N84-17487
ELECTRICAL FAULTS
Power subsystem automation study
[NASA-CR-170974] N84-17686
Electrical-shock prevention. Volume 2: Ground-fault interrupting devices
[PB84-102953] N84-17866
Electrical-shock prevention. Volume 3: Fault protection for motion-drive equipment
[PB84-102961] N84-17867
ELECTRICAL INSULATION
An experimental investigation of electric flashover across solid insulators in vacuum
[NASA-CR-175379] N84-17478
ELECTRICAL MEASUREMENT
Cyclic voltammetry of polysulfide (Thiokol) prepolymers and related compounds
[MRL-R-911] N84-17387
AC voltage calibrations for the 0.1 Hz to 10 Hz frequency range
[PB84-109867] N84-17570
ELECTRICAL RESISTIVITY
Comparison of the characteristics of graphites irradiated at 600 and 9000 deg C
[DE83-015695] N84-17297
Conductivity mapping of underground flow channels and moisture anomalies in carbonate terrain using electromagnetic methods
[DE84-004098] N84-17677
Optimum dimensions of solid zirconium dioxide-base electrolyte in transducer of activity meter N84-18064
Characterization of high temperature electrically conducting oxides
[DE84-002887] N84-18076
ELECTRO-OPTICS
RLE (Research Laboratory of Electronics)
[AD-A134812] N84-17495
Long wavelength InGaAsP/InP lasers and optoelectronic integration N84-17573
Synoptic meteorology during the SNOW-ONE-A field experiment
[AD-A134888] N84-17762

ELECTROCHEMICAL CORROSION
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A135549] N84-17363
Fundamental mathematical principles for electrochemical engineering
[DE84-002181] N84-17975
ELECTROCHEMISTRY
Chemical and electrochemical properties in molten alkaline hydroxides
[BLL-RISLEY-TR-4854-(9091.9F)] N84-17298
Chemical and electrochemical properties in molten alkaline hydroxides. 3: Oxide and acid complexes of some metallic cations
[BLL-RISLEY-TR-4858-(9091.9F)] N84-17299
Molten salt electrochemical systems
[AD-A135108] N84-17304
A photoacoustic study of chemically active systems
[AD-A134663] N84-17311
The electrochemical behaviour of titanium platinum alloys in anodic oxidation processes. 1: Kinetics and selectivity of the process of the combined formation of O2, H2S2O8 and O3 on the titanium-platinum alloy
[BLL-OA-TRANS-3093-(6196.3)] N84-17336
Structural and electrochemical properties of platinum-titanium laser surface alloys N84-17346
Electrochemical carbon dioxide concentrator subsystem development
[NASA-CR-166538] N84-17857
ELECTRODEPOSITION
Electrodeposition method
[BLL-OA-TRANS-3134-(6196.3)] N84-17337
ELECTRODES
The effect of gas bubbles and cavity dimensions on the local electrode potential within pits, crevices and cracks
[AD-A134729] N84-17364
Electrode noise in beta aluminas
[AD-A134837] N84-17497
Optimum dimensions of solid zirconium dioxide-base electrolyte in transducer of activity meter N84-18064
ELECTRODYNAMICS
Investigation of electrodynamic stabilization and control of long orbiting tethers
[NASA-CR-170972] N84-17251
Electrodynamic interactions between a tethered satellite system and the ionosphere N84-17279
ELECTROLYSIS
Production of titanium powders by the electrolysis of chloride-fluoride melts with a soluble anode
[BLL-OA-TRANS-3136-(6196.3)] N84-17338
Process and cell arrangement for producing difficult to reduce elements by fused salt electrolysis
[BLL-OA-TRANS-3137-(6196.3)] N84-17339
Deposition of polymer films on metal by the electrolysis of aqueous solutions of vinyl monomers
[BLL-LTS-1200/83-(5826.4F)] N84-17386
Static feed water electrolysis subsystem testing and component development
[NASA-CR-166539] N84-17856
ELECTROLYTES
Molten salt electrochemical systems
[AD-A135108] N84-17304
Electrodeposition method
[BLL-OA-TRANS-3134-(6196.3)] N84-17337
Fundamental mathematical principles for electrochemical engineering
[DE84-002181] N84-17975
ELECTROMAGNETIC ACCELERATION
Experimental electromagnetic launchers at MRL
[MRL-R-894] N84-17482
ELECTROMAGNETIC COMPATIBILITY
Achievement of electromagnetic compatibility in weapon systems — ships N84-17430
ELECTROMAGNETIC INTERACTIONS
Electrodynamic interactions between a tethered satellite system and the ionosphere N84-17279
New horizons in electromagnetic physics
[DE84-002600] N84-18039
ELECTROMAGNETIC INTERFERENCE
Handbook for broadband isotropic antenna system. Volume 1: Operation manual
[PB84-101948] N84-17510
ELECTROMAGNETIC MEASUREMENT
Comparative antenna measurements in real environment: Steerable null antenna at 30 - 76 MHz
[FOA-C-30303-E2] N84-17459
ELECTROMAGNETIC PROPERTIES
Metallic microwave conductivity in shock-loaded rutile
[DE84-002174] N84-18075
ELECTROMAGNETIC PULSES
SAPIENS MEMO 5: The mechanical design of the EMP-simulator SAPIENS
[FOA-C-30320-A3] N84-17192
Nuclear explosion effects on telecommunication, etc. (effect of EMP and of ionizing radiation on electronics and optical electronics
[FOA-C-30302-A3] N84-17458
ELECTROMAGNETIC RADIATION
Biological Effects of Nonionizing Electromagnetic Radiation, volume 7, number 2-4, July - December 1982
[AD-A134674] N84-17805
ELECTRON BEAMS
Virtual cathode oscillations
[AD-A135120] N84-18027
External injection into a high current modified betatron accelerator
[AD-A134694] N84-18030
ELECTRON CYCLOTRON HEATING
Polarizing holographic reflector for Electron Cyclotron Resonant Heating (ECRH) on the Tandem Mirror Experiment Upgrade (TMX-U)
[DE84-003740] N84-17568
Circular waveguide systems for electron-cyclotron-resonant heating of the tandem mirror experiment-upgrade
[DE84-003739] N84-18062
ELECTRON DENSITY (CONCENTRATION)
Muon spin rotation in solids
[NASA-CR-172789] N84-18067
ELECTRON DENSITY PROFILES
Anomalous behavior of ISEE-1 detected by the electron density experiment N84-17259
Automatic real time ionogram scaler with true height analysis - artist
[AD-A135174] N84-17732
ELECTRON EMISSION
An experimental investigation of electric flashover across solid insulators in vacuum
[NASA-CR-175379] N84-17478
ELECTRON ENERGY
Observations of the GEOS-2 equilibrium potential and its relation to the ambient electron energy distribution N84-17256
The concepts of critical temperature and energy cutoff of ambient electrons in high voltage charging of spacecraft N84-17275
ELECTRON GUNS
Influence of wake and photoemission on electric field measurements with a double probe on GEOS-2 N84-17261
Active control of the potential of ISEE-1 by an electron gun N84-17278
Ion source for a rocket payload
[AD-A135051] N84-17289
ELECTRON MOBILITY
Electron ballistic effects in III-V semiconductors
[AD-A135353] N84-18072
ELECTRON PARAMAGNETIC RESONANCE
Metallic microwave conductivity in shock-loaded rutile
[DE84-002174] N84-18075
ELECTRON STATES
Velocity and electronic state distributions of sputtered Fe atoms by laser-induced fluorescence spectroscopy
[DE84-003649] N84-18040
ELECTRON TRANSITIONS
Elementary excitations in semiconductor superlattices structures N84-18065
ELECTRONIC COUNTERMEASURES
Analysis of electrical accident prevention countermeasures
[PB84-102987] N84-17869
ELECTRONIC EQUIPMENT
Quantitative Secondary Ion Mass Spectroscopy (SIMS)
[AD-A134195] N84-17315
Testability of interconnection structures
[AD-A135431] N84-17607
ELECTRONIC EQUIPMENT TESTS
Test Operations Procedure: Signal converters
[AD-A134615] N84-17446
Preparation of standard electrical testability provisions for space equipment. Volume 1: Executive summary
[DM.51/CV/JP/327.83-VOL-1] N84-17507
Preparation of standard electrical provisions for space equipments
[DM.51/CV/JP/327.83-VOL-2] N84-17508
ELECTRONIC FILTERS
Linear time-variant space-variant filters and the WKB approximation
[AD-A134886] N84-18021
ELECTRONICS
STEP electronic system design N84-17214
ELECTROPHORESIS
Comparison of organisms and cell types using two-dimensional electrophoresis
[DE84-003574] N84-17807
ELECTROPHYSICS
Basic and applied research in the field of electronics and communications
[AD-A135283] N84-17487
ELECTROPLATING
Pilot system for the purification of rinse water and for the recuperation of metals in electroplating companies. Pilot system metal recovery from waste water (RMA)
[BMFT-FB-T-83-206] N84-17323
Aluminum-manganese plating from a molten salt bath
[AD-A135240] N84-17356
ELECTRORETINOGRAPHY
ERG (Electroretinogram) implicit time: An exploration of high frequency wavelets recorded in the human visual system
[AD-A134575] N84-17832
ELECTROSTATIC PRECIPITATORS
Experimental investigation concerning the feasibility of electrostatic precipitators at high pressures and temperatures — gas cleaning systems for coal conversion
[BMFT-FB-T-83-201] N84-17704
ELECTROSTATIC PROBES
Probe measurement of DC electric fields — SCATHA satellite charging N84-17255
The potential of ISEE in different plasma environments N84-17257
Influence of wake and photoemission on electric field measurements with a double probe on GEOS-2 N84-17261
Ion measurements on GEOS using a negatively biased sensor on a positively charged spacecraft N84-17263
Incident velocity distributions on sampling electrodes of spacecraft plasma instruments N84-17267
Impact ionization effects on Pioneer Venus Orbiter N84-17270
ELECTROSTATICS
Adaptive microwave reflector N84-17235
ELEMENTARY PARTICLE INTERACTIONS
Activities in nuclear and high energy physics N84-18043
ELEVATION
A new derivation for the rough surface reflection coefficient and for the distribution of sea wave elevations
[AD-A134774] N84-17453
ELLIPTIC DIFFERENTIAL EQUATIONS
A finite difference scheme for the equilibrium equations of elastic bodies
[NASA-CR-172293] N84-17621
A multigrid method and a combined multigrid-conjugate gradient method for elliptic problems with strongly discontinuous coefficients in general domains
[PUBL-604-REV.] N84-17980
EMISSION SPECTRA
Theoretical studies of solar-pumped lasers
[NASA-CR-173283] N84-17576
Observations of emission in bright, low redshift quasars
[NASA-CR-175376] N84-18122
EMISSIVITY
Infrared heating
[BLL-OA-TRANS-3121-(6196.3)] N84-17512
Remote sensing of sea ice --- Nimbus 7 scanning multichannel microwave radiometer (SMMR) N84-17664
ENDOCRINE SYSTEMS
Water immersion and its computer simulation as analogs of weightlessness
[NASA-CR-171746] N84-17821
ENERGETIC PARTICLES
The isotopic composition of energetic particles emitted from a large solar flare N84-18140
ENERGY CONVERSION
Development of technologies for very thin solar cells
[BMFT-FB-W-83-024] N84-17694
ENERGY CONVERSION EFFICIENCY
Refractory materials for high-temperature thermoelectric energy conversion
[NASA-CR-173159] N84-17388
ENERGY DISSIPATION
Electron acceleration in the front of intense collisionless shock waves
[PR-813] N84-17511
ENERGY DISTRIBUTION
Observations of the GEOS-2 equilibrium potential and its relation to the ambient electron energy distribution N84-17256
Energy distributions and yields of secondary ions and electrons emitted by GIOTTO during Halley encounter N84-17272
The concepts of critical temperature and energy cutoff of ambient electrons in high voltage charging of spacecraft N84-17275

ENERGY SPECTRA
The cosmic ray energy spectrum from 2 x 10-17 to 10-e-19 EV N84-18146
ENERGY STORAGE
Integrated Power/Attitude Control System (IPACS) technology experiment N84-17229
Photochemical energy storage (photosensitized isomerization of norbornadiene to quadricyclane by copper (I) complexes)
[AD-A135363] N84-17687
ENERGY TECHNOLOGY
Support development program for the qualification of solar farm collectors
[BMFT-FB-T-83-207] N84-17696
ENERGY TRANSFER
Thermal-energy transport from arc to rails in an arc-driven rail gun
[AD-A134991] N84-17499
Infrared heating
[BLL-OA-TRANS-3121-(6196.3)] N84-17512
De-excitation and equipartition in H2-surface collisions
[DE84-003008] N84-18031
ENGINE DESIGN
Automotive Stirling engine development program
[NASA-CR-168205] N84-18117
ENGINE INLETS
Theoretical and experimental engine-inlet flow fields for fighter forebodies
[NASA-TP-2270] N84-17132
ENGINE PARTS
Recommendations for future research on fracture mechanics life technology
[NASA-CR-170904] N84-17615
ENGINE TESTS
Automotive Stirling engine development program
[NASA-CR-168205] N84-18117
ENTHALPY
The practical use of data as to the solution enthalpies of molten Fe-V-Si
[BLL-M-35430-(5828.4)] N84-17342
ENTRAINMENT
Experimental study of bubble cavities attached to a rotating shaft in a reservoir
[NASA-TM-83586] N84-17533
ENTROPY
Vapor-liquid phase separator studies
[NASA-CR-166545] N84-17527
Entropy production during fatigue as a criterion for failure. The critical entropy threshold: A mathematical model for fatigue
[AD-A134767] N84-17628
Maximum entropy reconstruction of a volume anomaly from pulse scatter data
[DE84-002463] N84-18084
ENVIRONMENT EFFECTS
Interaction of the space shuttle orbiter with the ionospheric plasma N84-17265
Environmental factors as a source of failure in integrated circuits N84-17604
Geological and geochemical controls on the chemical evolution of subsurface water in undisturbed and surface-mined landscapes in western North Dakota
[PB84-126952] N84-17685
Evaluation of wind field interpolation schemes used in studies of regional-scale pollutant transport
[DE84-003634] N84-17699
Can we delay a greenhouse warming
[DE84-003390] N84-17703
Air pollution effects on terrestrial ecosystems
[PB84-128313] N84-17712
ENVIRONMENT MODELS
A program of research in environmental modeling
[NASA-CR-173281] N84-17697
ENVIRONMENT PROTECTION
Proceedings of the 18th International Conference on Coastal Engineering
[ISBN-0-7988-2553-7] N84-17783
ENVIRONMENTAL MONITORING
Journal of Research of the National Bureau of Standards. Volume 88, Number 3, May-June 1983
[PB84-115799] N84-17328
Extremely Low Frequency (ELF) communications system ecological monitoring program: Plan and summary of 1982 progress
[AD-A135482] N84-17445
Remote sensing: New satellite systems and potential applications --- conferences
[ESA-SP-205] N84-17650
Typical remote sensing data products N84-17656
Coastal zones inventory by high resolution satellites N84-17661
Environmental Radiation Data Report 33, January - March 1983
[PB84-104785] N84-17708
Environmental Radiation Data Report 31, July - September 1982
[PB84-104801] N84-17709
Environmental Radiation Data Report 32, October December 1982
[PB84-104793] N84-17710
ENVIRONMENTS
Inorganic analysis in a controlled ecological life support system
[NASA-CR-173299] N84-17852
EPOXY MATRIX COMPOSITES
A study of polymer matrix fatigue properties
[AD-A135078] N84-17294
Flammability characteristics of some epoxy resins and composites
[AD-A135282] N84-17394
EPOXY RESINS
Flammability characteristics of some epoxy resins and composites
[AD-A135282] N84-17394
Development of a stable epoxy resin system for composite repair
[AD-A135390] N84-17395
EQUATIONS
The discrete convolution method for solving some large moment matrix equations
[AD-A135420] N84-18007
EQUATIONS OF MOTION
Bifurcation analysis of aircraft pitching motions near the stability boundary
[NASA-TM-85881] N84-17137
Validation methods for mathematical models of flexible satellite dynamics
[ESA-CR-(P)-1794] N84-17241
The question of optimization of three-dimensional maneuver of orbital apparatus in the atmosphere
[AD-A134753] N84-17280
EQUATIONS OF STATE
Equation of state of fluid NH-3 from P-V-T and ultrasound measurements to 12 kbar
[DE83-015913] N84-17316
Hydrogen sulfide provisional thermophysical properties from 188 to 700 K at pressures to 75 MPa
[PB84-122704] N84-17329
EQUATORIAL ATMOSPHERE
FGGE level 3-B daily global analyses. Part 2: (Mar. 1979 - May 1979)
[PB84-100270] N84-17780
EQUATORIAL REGIONS
FGGE level 3-B daily global analyses. Part 2: (Mar. 1979 - May 1979)
[PB84-100270] N84-17780
EQUILIBRIUM EQUATIONS
A finite difference scheme for the equilibrium equations of elastic bodies
[NASA-CR-172293] N84-17621
EQUIPMENT SPECIFICATIONS
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 1: Executive summary
[ERC-RP-200-DS-009-VOL-1] N84-17423
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 2: Technical descriptions
[ERC-RP-200-DS-009-VOL-2] N84-17424
Handbook for broadband isotropic antenna system. Volume 1: Operation manual
[PB84-101948] N84-17510
Spas color camera
[NASA-CR-171739] N84-17559
EROSION
Wheel efficiency in the diamond-spark erosion grinding of tungsten carbides
[CSIR-TRANS-1693] N84-17418
Development of a high pressure water jet for the rapid removal of concrete
[PB84-109909] N84-17426
Proceedings of the 18th International Conference on Coastal Engineering
[ISBN-0-7988-2553-7] N84-17783
ERROR ANALYSIS
Principal facts for gravity stations in the Nevada portion of the Kingman 1 degree by 2 degree quadrangle
[PB84-103084] N84-17749
TERR, PERR, and GIGC: Three programs to compute verification statistics
[PB84-127521] N84-17775
A theoretical approach to measuring pilot workload
[NASA-CR-173297] N84-17859
ERROR DETECTION CODES
Analysis of an error detection scheme for parallel computations
[AD-A134819] N84-17496
ERRORS
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134834] N84-17155
Measurement of robot accuracy using the Latin Square Three-Dimensional Ball Plate
[DE84-004920] N84-17862
ERS-1 (ESA SATELLITE)
The first European Remote Sensing Satellite (ERS-1): Overall description, potential applications and users N84-17654
Scatterometer System Simulator (SSS), phase 1: Definition --- ERS-1 (ESA satellite)
[ESA-CR(P)-1788] N84-17765
ESCAPE SYSTEMS
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 1
[AD-A134833] N84-17154
ESTERS
Time-temperature studies of high temperature deterioration phenomena in lubricant systems: Synthetic ester lubricants
[AD-A135464] N84-17594
ESTIMATES
Preparing meteorological data for use in routine dispersion calculations: Workgroup summary
[PB84-119690] N84-17774
ESTIMATING
Hierarchical cache accumulators for sequential mode estimation
[AD-A134898] N84-17908
Spline-based estimation techniques for parameters in elliptic distributed systems
[NASA-TM-85439] N84-17947
Algorithms, modeling and estimation for linear systems
[AD-A135134] N84-17951
ETHANE
Diesel fuel extenders and substitutes
[DE84-003402] N84-17597
ETHERS
Time-temperature studies of high temperature deterioration phenomena in lubricant systems: Synthetic ester lubricants
[AD-A135464] N84-17594
EUCLIDEAN GEOMETRY
Multi-dimensional continued fraction algorithms N84-18003
EULER EQUATIONS OF MOTION
Spectral methods for the Euler equations: Chebyshev methods and shock-fitting
[NASA-CR-172295] N84-17118
Spectral methods for the Euler equations: Fourier methods and shock-capturing
[NASA-CR-172294] N84-17119
Studies and vorticity effects by the Euler equations with emphasis on supersonic flow fields
[AD-A135118] N84-17535
Automatic adaptive grid refinement for the Euler equations
[NASA-CR-173161] N84-17977
La Recherche Aerospatiale, bimonthly bulletin number 1983-2, 213/March-April
[ESA-TT-817] N84-18013
Hot wire in low Reynolds number flow N84-18087
Calculating C-grids with fine and embedded mesh regions
[CFDL-TR-83-7] N84-18090
EUROPEAN SPACE PROGRAMS
Space research in Switzerland N84-17200
Laboratory measurement of impact ionization N84-17271
Energy distributions and yields of secondary ions and electrons emitted by GIOTTO during Halley encounter N84-17272
A model of electrostatic charging and sheath structure of GIOTTO near Halley's comet N84-17274
EVALUATION
Computer Science and Technology: Proceedings of the 19th Meeting of the Computer Performance Evaluation Users Group (CPEUG)
[PB84-114529] N84-17892
Services for the analysis and evaluation of information
[PB84-104504] N84-18113
EVAPORATION
Thermal and electric energy and desalination with a salt gradient solar pond
[DE84-900416] N84-17691
Frontogenesis in a moist atmosphere
[PB84-104066] N84-17779
EXCAVATION
Robotic technology applied to Army mobility systems
[AD-A134728] N84-17933
EXCITATION
Excited state kinetics of mercury halides and mixtures with N2 and Xe
[AD-A135432] N84-17310
Elementary excitations in semiconductor superlattices structures N84-18065

EXERCISE PHYSIOLOGY
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824
Physiological responses to prolonged upper body exercise
[AD-A134811] N84-17826
EXHAUST EMISSION
Apparatus and method for destructive removal of particles contained in flowing fluid
[NASA-CASE-NPO-15426-1] N84-17555
An analysis of carbon monoxide emissions as a function of ambient temperature and vehicle parameters
[PB84-103629] N84-17599
Exhaust emissions from a diesel engine
[PB84-122910] N84-17713
Effects of diesel vehicles on visibility in California
[PB84-122167] N84-17714
EXHAUST GASES
Characteristics of a four nozzle, slotted mixing stack with slanted shroud, gas eductor system
[AD-A134794] N84-17547
EXOBIOLOGY
A new dimension in space experimentation
[NASA-NF-140] N84-17210
EXOSPHERE
A new model of the geomagnetic variation in the upper atmosphere
[AD-A135210] N84-17733
EXPERIMENT DESIGN
STEP experiment integration N84-17215
Model mission study for laser synchronization of clocks
[SNIAS-221-CA/LP] N84-17589
EXPERIMENTAL BREEDER REACTOR 2
Correlation of fracture toughness with tensile properties for irradiated 20% cold-worked 316 stainless steel
[DE84-003954] N84-17379
EXPERT SYSTEMS
Mutual adaptiveness of man and machine in information acquisition tasks
[AD-A135449] N84-17932
Search algorithms and their implementation
[AD-A135154] N84-17953
EXPLOSIONS
Electrical-shock prevention. Volume 1: Protection of maintenance personnel
[PB84-102946] N84-17865
EXPLOSIVE FORMING
Shock compaction of molybdenum powder
[NASA-CR-173154] N84-17369
Dynamic consolidation of ceramic powders: Practicalities, problems, and prospects
[DE84-003744] N84-17404
EXPLOSIVES
The MRL small scale gap test for the assessment of shock sensitivity of high explosives
[MRL-R-896] N84-17408
EXPONENTIAL FUNCTIONS
Isotonic procedures for selecting populations better than a standard: Two-parameter exponential distributions
[AD-A135445] N84-17985
A Bayesian explanation of an apparent failure rate paradox
[AD-A134748] N84-17987
EXPONENTS
Factorization algorithms of exponential order N84-17994
EXPOSURE
Development of power system measurements
[PB84-109891] N84-17509
Review of the National Ambient Air Quality Standards for sulfur oxides: Assessment of scientific and technical information
[PB84-102920] N84-17711
Rabbit neurobehavioral toxicity from aluminum
[PB84-103266] N84-17809
Rationale for a Threshold Limit Value (TLV)R for JP-4/Jet B wide cut aviation turbine fuel
[AD-A134814] N84-17827
Human exposure to atmospheric concentrations to selected chemicals, volume 1
[PB84-102540] N84-17835
EXTERNAL STORE SEPARATION
Aerodynamic characteristics of a Sparrow 3 missile model in the flow field of a generalized parent body at Mach 2.86
[NASA-TM-85713] N84-17134
EXTERNAL SURFACE CURRENTS
Spacecraft/plasma interactions and their influence on field and particle measurements --- conferences
[ESA-SP-198] N84-17253
Probe measurement of DC electric fields --- SCATHA satellite charging N84-17255
The potential of ISEE in different plasma environments N84-17257
Methods for keeping a conductive spacecraft near the plasma potential N84-17277
EXTERNAL TANKS
Space Shuttle ice suppression system validation, volume 2
[NASA-CR-171741] N84-17245
EXTRATERRESTRIAL INTELLIGENCE
Belt of life in the galaxy
[PR-76] N84-18127
EXTREMELY HIGH FREQUENCIES
V-band integrated quadriphase modulator
[NASA-CR-175159] N84-17480
EXTREMELY LOW FREQUENCIES
Extremely Low Frequency (ELF) communications system ecological monitoring program: Plan and summary of 1982 progress
[AD-A135482] N84-17445
EYE MOVEMENTS
Temporal aspects of eye movement when viewing multiple targets
[AD-A134853] N84-17828

F

F-14 AIRCRAFT
Identification of bottlenecks and capacity constraints in F-14, F-15, F-16, and F/A-18 aircraft production
[AD-A134629] N84-17121
F-15 AIRCRAFT
Identification of bottlenecks and capacity constraints in F-14, F-15, F-16, and F/A-18 aircraft production
[AD-A134629] N84-17121
F-16 AIRCRAFT
Identification of bottlenecks and capacity constraints in F-14, F-15, F-16, and F/A-18 aircraft production
[AD-A134629] N84-17121
F-18 AIRCRAFT
Identification of bottlenecks and capacity constraints in F-14, F-15, F-16, and F/A-18 aircraft production
[AD-A134629] N84-17121
FABRICATION
Development of a high pressure water jet for the rapid removal of concrete
[PB84-109909] N84-17426
Research in VLSI systems. Heuristic programming project and VLSI theory project. A fast turn around facility for very large scale integration (VLSI)
[AD-A134809] N84-17494
Linear Fresnel lens photovoltaic concentrator program
[DE84-002971] N84-17689
FACSIMILE COMMUNICATION
Microfiche Image Transmission System (MITS) demonstration field evaluation of microfacsimile
[AD-A134716] N84-17450
FACTORIZATION
Computational methods in number theory, part 1
[MATH-CENTRE-TRACTS-154-PT-1] N84-17990
Factorization algorithms of exponential order N84-17994
Analysis and comparison of some integer factoring algorithms N84-17995
Factorization of polynomials N84-17998
Quadratic fields and factorization N84-18002
FAILURE
Environmental factors as a source of failure in integrated circuits N84-17604
Program for the analysis of fault trees
[AD-A134746] N84-17910
A Bayesian explanation of an apparent failure rate paradox
[AD-A134748] N84-17987
FAILURE ANALYSIS
Sortie duration and helicopter component failures (an empirical study)
[AD-A134745] N84-17122
A reliability and failure mode analysis of celestial training device microcomputers employed by SAC and MAC
[AD-A135003] N84-17885
FALLOUT
Airborne fallout monitoring
[FOA-A-40045-A3] N84-17705
FAR FIELDS
Large amplitude waves generated by an explosive mechanism
[MRL-R-905] N84-17524
The effect of the artificial far field boundary on a finite different approximation of the Navier-Stokes equations for a compressible fluid
[AD-A135152] N84-17536
FARMLANDS
Comparison of the information content of data from the LANDSAT 4 Thematic Mapper and the multispectral scanner
[E84-10081] N84-17641
FAST FOURIER TRANSFORMATIONS
Validation methods for mathematical models of flexible satellite dynamics
[ESA-CR-(P)-1794] N84-17241
FASTENERS
Use of small crack data to bring about and quantify improvements to aircraft structural integrity
[AD-A135012] N84-17623
FATIGUE (MATERIALS)
Microstructural and mechanical aspects of fatigue crack initiation and growth in a 2048 aluminum alloy N84-17347
The change of the mechanical properties of steel strip in processing lines
[BMFT-FB-T-83-178] N84-17383
Three-dimensional measurements of fatigue crack closure
[NASA-CR-175366] N84-17616
Entropy production during fatigue as a criterion for failure. The critical entropy threshold: A mathematical model for fatigue
[AD-A134767] N84-17628
Study of thermal fatique of soldered photovoltaic cells by thermal resistance measurement
[DE84-003764] N84-17692
FATIGUE LIFE
A study of polymer matrix fatigue properties
[AD-A135076] N84-17294
Recommendations for future research on fracture mechanics life technology
[NASA-CR-170904] N84-17615
A review of fracture mechanics life technology --- linear elastic fracture mechanics
[NASA-CR-170903] N84-17622
FATIGUE TESTING MACHINES
Evaluation of a biaxial test fixture
[AD-A134845] N84-17629
FATIGUE TESTS
Preliminary study of thermomechanical fatigue of polycrystalline MAR-M 200
[NASA-TP-2280] N84-17350
FAULT TREES
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134834] N84-17155
Program for the analysis of fault trees
[AD-A134746] N84-17910
FEASIBILITY ANALYSIS
Feasibility assessment of JOVIAL to Ada translation
[AD-A134857] N84-17911
FECES
Standard research materials: Feces and urine N84-17854
FEDERAL BUDGETS
Meeting the automatic data processing and telecommunications needs of the federal government: A five-year plan
[PB83-195255] N84-18111
National Aeronautics and Space Administration Act, 1985 N84-18116
FEEDBACK
An algebraic approach to analysis and control of time-scales
[AD-A135115] N84-17949
FEEDBACK CONTROL
Asynchronous discrete control of continuous processes
[AD-A135257] N84-17930
Selection of noisy sensors and actuators for regulation of linear systems --- large space structures
[AD-A135442] N84-17931
Robotic technology applied to Army mobility systems
[AD-A134728] N84-17933
FEEDFORWARD CONTROL
Adaptive feedforward linear wideband HF power bank
[AD-A134744] N84-17493
FEMALES
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824
The objective evaluation of aircrew protective breathing equipment. 5: Mask/goggles combinations for female crewmembers
[AD-A134912] N84-17830
FERMI LIQUIDS
Specific heat of He-3 in the Fermi-liquid region
[DE83-014858] N84-17566
FERMIONS
Formulae for configuration averages of products of 1-body and 2-body operators in many-fermion spaces
[DE84-002634] N84-17971
FERRITIC STAINLESS STEELS
Effect of specimen size and nickel content on the impact properties of 12 Cr-1 MoVW ferritic steel
[DE84-003270] N84-17377

FERROELECTRICITY
Theory of dynamic ferroelectricity
[DE84-002609] N84-17500
FERROMAGNETISM
Method of high-temperature expansions in short-range order theory
[BLL-M-35385-(5828.4)] N84-17344
Calculating the magnetic field from a saddle-shaped coil without a ferromagnetic circuit
[AD-A134776] N84-18011
FIBER OPTICS
Fourier transform and polychromator studies of the inductively coupled plasma
[DE84-003975] N84-18059
FIBER REINFORCED COMPOSITES
Effects of high energy radiation on the mechanical properties of epoxy graphite fiber reinforced composites
[NASA-CR-173293] N84-17292
FIELD EFFECT TRANSISTORS
The 20 GHz spacecraft FET solid state transmitter
[NASA-CR-168240] N84-17477
GaAs FET logic at low temperatures
[AD-A135007] N84-17483
FIELD THEORY (ALGEBRA)
The covariant classification of two-dimensional smooth commutative formal groups over an algebraically closed field of positive characteristic
[MATH-CENTRE-TRACTS-157] N84-17969
Quadratic fields and factorization N84-18002
FIELD THEORY (PHYSICS)
Mean field theory of the linear sigma-model: Chiral solitons
[DE84-002864] N84-18034
New horizons in electromagnetic physics
[DE84-002600] N84-18039
FIGHTER AIRCRAFT
Wave drag as the objective function in transonic fighter wing optimization
[NASA-TP-2265] N84-17127
A study of prediction methods for the high angle-of-attack aerodynamics of straight wings and fighter aircraft
[NASA-CR-3764] N84-17131
Theoretical and experimental engine-inlet flow fields for fighter forebodies
[NASA-TP-2270] N84-17132
Wind-tunnel free-flight investigation of a model of a forward-swept-wing fighter configuration
[NASA-TP-2230] N84-17184
A strategy for improving overhead cost control
[AD-A134661] N84-18092
FINANCIAL MANAGEMENT
A 1983 science and technology posture hearing with Director, Office of Science and Technology Policy
[GPO-21-095] N84-18085
FINE STRUCTURE
Velocity and electronic state distributions of sputtered Fe atoms by laser-induced fluorescence spectroscopy
[DE84-003649] N84-18040
Angle-resolved photoemission extended fine structure
[DE84-002899] N84-18080
FINITE DIFFERENCE THEORY
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 2: Numerical predictions of isothermal flowfields in a ducted centerbody combustor
[AD-A134692] N84-17543
A finite difference scheme for the equilibrium equations of elastic bodies
[NASA-CR-172293] N84-17621
A computer program for solving the parabolic equation using an implicit finite-difference solution method and incorporating exact interface conditions
[AD-A135325] N84-17903
Accuracy of stable schemes for 2D scalar conservation laws
[DE84-004989] N84-17976
FINITE ELEMENT METHOD
Loads and aeroelasticity division research and technology accomplishments for FY 1983 and plans for FY 1984
[NASA-TM-85740] N84-17135
Simulation of natural convection in a rectangular loop using finite elements
[DE84-003477] N84-17550
Development of a thermal and structural model for a NASTRAN finite-element analysis of a hypersonic wing test structure
[NASA-CR-170413] N84-17620
Frequency and mode shape calculations for vertical axis wind turbines using reduction techniques and complex eigensolvers
[DE84-003316] N84-17633
Temporal finite elements based on a minimum principle for initial value problems N84-17935
Journal on Numerical Methods and Computer Applications (selected articles)
[AD-A134752] N84-17967
A comparison of explicit time integration techniques for the finite element shock wave equations
[AD-A134757] N84-17968
L2-projection for transferring data between finite element meshes
[DE84-000063] N84-17973
Numerical computation of steady state scattered sound external to submerged infinite cylinders by combining finite element and integral equation methods
[AD-A134773] N84-18020
FIRE EXTINGUISHERS
Integrated aircraft fuel tank inerting and compartment fire suppression system. Volume 2: Evaluation of nitrogen-enriched air as a fire suppressant
[AD-A134883] N84-17157
FIRE PREVENTION
Explosion and fire hazards in an oil-oxygen system --- of an airplane
[FOA-C-20507-D1] N84-17159
FIRES
Integrated aircraft fuel tank inerting and compartment fire suppression system. Volume 2: Evaluation of nitrogen-enriched air as a fire suppressant
[AD-A134883] N84-17157
Computer modeling of aircraft cabin fires
[PB84-101153] N84-17162
Fire propagation in concurrent flows
[PB84-100155] N84-17326
Civilian residential fire fatality rates: Six high-rate states versus six low-rate states
[PB84-102615] N84-17427
FISHERIES
Applications for fisheries --- satellite remote sensing N84-17663
FISSION PRODUCTS
Environmental Radiation Data Report 31, July - September 1982
[PB84-104801] N84-17709
Environmental Radiation Data Report 32, October December 1982
[PB84-104793] N84-17710
FISSURES (GEOLOGY)
Subsidence monitoring for state of Arizona
[PB84-126960] N84-17750
FLAME PROPAGATION
Bifurcation and stability theory with application to problems of combustion and flame propagation
[AD-A135383] N84-17306
Fire propagation in concurrent flows
[PB84-100155] N84-17326
FLAME STABILITY
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reaction flows
[NASA-CR-175365] N84-17520
FLAME TEMPERATURE
Intracavity laser excitation of NCO fluorescence in an atmospheric pressure flame
[AD-A134740] N84-17579
FLAMES
Mechanisms and reaction dynamics related to methane combustion
[PB84-100932] N84-17333
FLAMMABILITY
Structure, inhibition and extinction of polymer diffusion flames
[PB84-101336] N84-17327
Flammability characteristics of some epoxy resins and composites
[AD-A135282] N84-17394
FLANGES
A pressurized cylindrical shell with a fixed end which contains an axial part-through or through crack
[NASA-CR-173291] N84-17618
FLASHOVER
An experimental investigation of electric flashover across solid insulators in vacuum
[NASA-CR-175379] N84-17478
FLEXIBLE BODIES
The 2-dimensional inextensible lifting membrane airfoil, theory and experiment
[AD-A135251] N84-17147
FLEXIBLE SPACECRAFT
The effects of the space environment on damping materials and damping designs on flexible structures N84-17217
The 55-meter-structure flight experir ent N84-17233
Validation methods for mathematical models of flexible satellite dynamics
[ESA-CR-(P)-1794] N84-17241
FLIGHT CHARACTERISTICS
Mathematical modeling of the aerodynamic characteristics in flight dynamics
[NASA-TM-85880] N84-17141
Rotary wing aircraft and technical publications of NASA, 1970 - 1982
[NASA-TM-85521] N84-18102
FLIGHT CLOTHING
Impact response of an energy absorbing earcup
[AD-A134826] N84-17860
FLIGHT CONTROL
Airloads research study. Volume 2: Airload coefficients derived from wind tunnel data
[NASA-CR-10410] N84-17174
Automation, supervisory control and workload in flight management
[NASA-CR-166474] N84-17838
FLIGHT CREWS
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134834] N84-17155
Aircrew training devices: Utility and utilization of advanced instructional features. Phase I: Tactical Air Command
[AD-A135052] N84-17190
Assessment of the functional state of the heart muscle in aircrew members by means by bicycle ergometry N84-17815
The concept of working capacity of the flight crew N84-17837
FLIGHT FATIGUE
Prevention of flight fatigue by physical training N84-17812
FLIGHT FITNESS
Investigation of the microcirculation of the conjunctiva in airmen with the initial symptoms of cerebral atherosclerosis N84-17818
FLIGHT OPERATIONS
IMCS reflight certification requirements and design specifications
[NASA-CR-170968] N84-17167
FLIGHT PATHS
Path discrepancies between great circle and rhumb line
[NASA-TM-85522] N84-17168
FLIGHT SIMULATION
Instructor station display for use in T-37 flight simulation training
[AD-A134854] N84-17191
The effect of the artificial far field boundary on a finite different approximation of the Navier-Stokes equations for a compressible fluid
[AD-A135152] N84-17536
Visual cues in the simulation of low-level flight
[AD-A135461] N84-17839
Detection of flying targets in front of a land background: Laboratory tests
[FOA-C-56034-H2] N84-17848
FLIGHT SIMULATORS
Aircrew training devices: Utility and utilization of advanced instructional features. Phase I: Tactical Air Command
[AD-A135052] N84-17190
FLIGHT TESTS
A comparison of two position estimate algorithms that use ILS localizer and DME information. Simulation and flight test results
[NASA-TP-2281] N84-17165
Airloads research study. Volume 1: Flight test loads acquisition
[NASA-CR-170409] N84-17173
STEP flight experiments Large Deployable Reflector (LDR) telescope N84-17231
Flight test of a synthetic aperture radar antenna using STEP N84-17237
GEOS 1 and 2 in flight evaluation of the reaction control system
[SEP-TS/S/194/JM/30301/81(1)] N84-17242
Preliminary field tests for detecting flying targets in front of a land background --- ground observers
[FOA-C-56033-H2] N84-17847
Detection of flying targets in front of a land background: Field tests --- human observers
[FOA-C-56035-H2] N84-17849
FLIGHT TIME
Sortie duration and helicopter component failures (an empirical study)
[AD-A134745] N84-17122
FLIGHT TRAINING
A reliability and failure mode analysis of celestial training device microcomputers employed by SAC and MAC
[AD-A135003] N84-17885

FLOODS
Evaluation of the FEMA (Federal Emergency Management Agency) model for estimating potential coastal flooding from hurricanes and its application to Lee County, Florida
[PB84-105832] N84-17769

FLORIDA
Evaluation of the FEMA (Federal Emergency Management Agency) model for estimating potential coastal flooding from hurricanes and its application to Lee County, Florida
[PB84-105832] N84-17769

FLOW CHARACTERISTICS
Rules governing the distribution of a gas jet in a liquid. Communication 2
[BLL-M-35437-(5828.4)] N84-17513

FLOW DISTRIBUTION
Theoretical and experimental engine-inlet flow fields for fighter forebodies
[NASA-TP-2270] N84-17132
Space Shuttle ice suppression system validation, volume 1
[NASA-CR-171740] N84-17244
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 1: Two-dimensional laser Doppler anemometer studies of isothermal flowfield in a ducted centerbody combustor
[AD-A134691] N84-17542
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 2: Numerical predictions of isothermal flowfields in a ducted centerbody combustor
[AD-A134692] N84-17543
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolves Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
Acoustic imaging of vapor bubbles through optically non-transparent media
[DE84-003961] N84-18022
Flow behavior in the Wright Brothers Facility
[WBWT-TR-1187] N84-18088
Adaptation of two-dimensional transonic analysis code, TSFOIL, for use in modeling adaptive wall test sections N84-18089

FLOW EQUATIONS
Automatic adaptive grid refinement for the Euler equations
[NASA-CR-173161] N84-17977

FLOW MEASUREMENT
Flow technical problems with transitions between partial and complete filling and with flow measurement in channel sections. — sewage flow
[TUM-SFB-81] N84-17552
Leakage flow-induced vibrations of reactor components N84-17611
Universal single level implicit algorithm for gasdynamics
[NASA-CR-166531] N84-17936

FLOW STABILITY
Understanding transition to turbulence in shear layers
[AD-A134796] N84-17548
Baroclinic inertial instability in the non-static equilibrium atmosphere
[BLL-TRANS-1568-(9022.552)] N84-17751
Virtual cathode oscillations
[AD-A135120] N84-18027

FLOW VELOCITY
Turbulence and mass motion in galactic molecular clouds N84-18129

FLUID FILLED SHELLS
A nonintrusive nuclear monitor for measuring liquid contents in sealed vessels
[NASA-TM-85754] N84-17560

FLUID FILMS
Study of the lubrication mechanism of thin film lubricated concentrated steel contacts. The influence of pre-treatment of the steel on the load carrying capacity
[AD-A135067] N84-17593

FLUID FLOW
Fundamentals of non-Newtonian liquid flow on surfaces
[AD-A135543] N84-17541
Conductivity mapping of underground flow channels and moisture anomalies in carbonate terrain using electromagnetic methods
[DE84-004096] N84-17677
Blood flow measurements under high-G conditions: Early prediction of Gz tolerance
[AD-A134653] N84-17823

FLUID JETS
Turbulence measurements in plane jets and plumes in crossflow
[PB84-105303] N84-17554

FLUID MECHANICS
Thermocapillary flows and their stability: Effects of surface layers and combination
[NASA-CR-170962] N84-17522

FLUIDIZED BED PROCESSORS
Studies on the mechanics of rapidly flowing granular-fluid materials
[AD-A135463] N84-17540

FLUORESCENCE
The cosmic ray energy spectrum from 2 x 10-17 to 10-e-19 EV N84-18146

FLUTTER ANALYSIS
Aeroelastic analysis using nonlinear aerodynamic methods
[AD-A135133] N84-17146

FOCUSING
Focusing the parabolic antenna
[NASA-CR-173304] N84-17642

FOILS (MATERIALS)
Surface compatibility studies of potassium perchlorate reaction with pyrotechnic fuels
[DE84-002829] N84-17412

FOLDING STRUCTURES
Low concentration ratio solar array structural configuration N84-17225

FOREBODIES
Theoretical and experimental engine-inlet flow fields for fighter forebodies
[NASA-TP-2270] N84-17132

FORECASTING
Can we delay a greenhouse warming
[DE84-003390] N84-17703

FOREST FIRE DETECTION
Remote sensing from space for forestry purposes N84-17659

FOREST MANAGEMENT
Remote sensing from space for forestry purposes N84-17659

FORESTS
Test of the use of LANDSAT imagery to detect changes in the area of forest in the tropics
[DE84-004444] N84-17680
Atmospheric deposition to forests
[DE84-003384] N84-17700

FORMALISM
Automatic synthesis of abstract data type implementations from abstract specifications N84-17896
Machine models, computational complexity and number theory N84-17991

FORMAT
Initial graphics exchange specification test library, version 1.3
[PB84-102144] N84-17922

FORTRAN
Computer models for two-dimensional transient heat conduction
[AD-A134893] N84-17549
Sperry Univac, Univac 1100/80, ASCII FORTRAN level 10R1A
[PB84-113893] N84-17920
Thermodynamics library for AFOS (Automation of Field Operations and Services) programmers (THERMO LB)
[PB84-122621] N84-17925

FORWARD SCATTERING
Evaluation of visibility sensors at the Eglin Air Force Base climatic chamber
[AD-A135375] N84-17758

FOURIER ANALYSIS
Spectral methods for the Euler equations: Fourier methods and shock-capturing
[NASA-CR-172294] N84-17119
Eisenstein series on the metaplectic group: An algebraic approach
[MATH-CENTRE-TRACTS-161] N84-17937

FOURIER TRANSFORMATION
Fourier transform and polychromator studies of the inductively coupled plasma
[DE84-003975] N84-18059

FRACTURE MECHANICS
Disclinations in carbon-carbon composites
[AD-A135248] N84-17295
Crack propagation in polystyrene under fixed elongation
[AD-A134749] N84-17399
Recommendations for future research on fracture mechanics life technology
[NASA-CR-170904] N84-17615
A pressurized cylindrical shell with a fixed end which contains an axial part-through or through crack
[NASA-CR-173291] N84-17618
A review of fracture mechanics life technology — linear elastic fracture mechanics
[NASA-CR-170903] N84-17622
A study on the tensile strength of ice as a function of grain size
[AD-A134889] N84-17631

FRACTURES (MATERIALS)
Fracture and contact problems for linearly viscoelastic material
[AD-A135111] N84-17624

FRACTURING
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 1
[AD-A135387] N84-17626
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 2
[AD-A135388] N84-17627
Mechanical and transport properties of rocks at high temperatures and pressures. Task 3. Mechanical properties of rocks at high temperatures and pressures
[DE84-003438] N84-17740

FRAMES
Nonlinear geometric, material and time dependent analysis of reinforced concrete shells with edge beams
[PB84-104454] N84-17639

FREE ELECTRON LASERS
The evolution of spontaneous and coherent radiation in the free electron laser oscillator
[AD-A134458] N84-17583
Radially resolved simulation of a high-gain free electron laser amplifier
[DE84-003751] N84-17585
Nonlinear resonance
[AD-A135117] N84-17950

FREE JETS
Investigation of free jets issued from small solid propellant rocket engines N84-17290
Hot wire in low Reynolds number flow N84-18087

FREEZING
Transport of water in frozen soil. I: Experimental determination of soil-water diffusivity under isothermal conditions
[AD-A135419] N84-17671

FREON
Interaction of weak shock waves and discrete gas inhomogeneities N84-17517

FREQUENCY DIVISION MULTIPLEXING
FM spectral modeling and FDM/FM simulation programs
[PB84-118934] N84-17469

FREQUENCY MODULATION
A catalogue of spreading modulation spectra
[AD-A134850] N84-17454
FM spectral modeling and FDM/FM simulation programs
[PB84-118934] N84-17469
Amplitude Compandored Sideband compared to conventional frequency modulation for VHF mobile radio: Laboratory and field testing results
[PB84-116383] N84-17474

FREQUENCY STANDARDS
Journal of Research of the National Bureau of Standards. Volume 88, Number 5, September-October 1983
[PB84-125293] N84-17406
Rubidium frequency standard study
[AD-A134713] N84-17492

FRESNEL LENSES
Linear Fresnel lens photovoltaic concentrator program
[DE84-002971] N84-17689

FRICTION
Friction and wear behavior of aluminum and composite airplane skins
[NASA-TP-2262] N84-17175
Tribological characteristics of gold films deposited on metals by ion plating and vapor deposition
[NASA-TM-83572] N84-17352
Friction and wear reduction of 440C stainless steel by ion implantation
[DE84-003255] N84-17371

FRONTS (METEOROLOGY)
Synoptic meteorology during the SNOW-ONE-A field experiment
[AD-A134888] N84-17762
Frontogenesis in a moist atmosphere
[PB84-104066] N84-17779

FUEL CELLS
Development of a solar energy system
[DE83-014236] N84-17690
Development of a solar energy system: Executive summary
[DE83-014392] N84-17693

FUEL COMBUSTION
Mechanisms and reaction dynamics related to methane combustion
[PB84-100932] N84-17333
Aviation-fuel property effects on combustion
[NASA-CR-168334] N84-17407

FUEL CONSUMPTION
Prediction of an apparent flame length in a co-axial jet diffusion flame combustor
[AD-A135088] N84-17303
FUEL SYSTEMS
Emission FTIR analyses of thin microscopic patches of jet fuel residue deposited on heated metal surface
[NASA-CR-168331] N84-17410
FUEL TANKS
Integrated aircraft fuel tank inerting and compartment fire suppression system. Volume 2: Evaluation of nitrogen-enriched air as a fire suppressant
[AD-A134883] N84-17157
FUNCTION SPACE
L2-projection for transferring data between finite element meshes
[DE84-000063] N84-17973
FUNCTIONS (MATHEMATICS)
Aeroelastic analysis using nonlinear aerodynamic methods
[AD-A135133] N84-17148
FUSELAGES
Calculation of the aerodynamic flow field in the vicinity of a Sea King helicopter
[ARL-AERO-REPT-158] N84-17128
FUSION REACTORS
Modification of alloy surface composition by segregation processes as a means of impurity control in fusion devices
[DE84-003645] N84-17373
Effects of pulsed and/or dual ion irradiation on microstructural evolution in a Ti and Si modified Austenitic alloy
[DE84-003411] N84-17374
Circular waveguide systems for electron-cyclotron-resonant heating of the tandem mirror experiment-upgrade
[DE84-003739] N84-18062

G

GALACTIC EVOLUTION
The physical nature of the continuum in active galaxies N84-18128
GALACTIC RADIATION
Limits on diffuse X-ray emission from M101
[NASA-CR-173277] N84-18147
A study of the diffuse galactic gamma radiation
[NASA-TM-86055] N84-18151
GALACTIC ROTATION
Belt of life in the galaxy
[PR-76i] N84-18127
GALAXIES
Turbulence and mass motion in galactic molecular clouds N84-18129
Milgrom's revision of cosmic dynamics: Amending Newton's laws or Keplers?
[NASA-TM-86049] N84-18132
GALLIUM ARSENIDE LASERS
Long wavelength InGaAsP/InP lasers and optoelectronic integration N84-17573
GALLIUM ARSENIDES
GaAs FET logic at low temperatures
[AD-A135007] N84-17483
Advanced on-board signal procesor GaAs memory
[AD-A135465] N84-17890
InGaPAs by metalorganic chemical vapor deposition
[AD-A135281] N84-18069
Thermal conductivity of ternary and quaternary III-V compounds
[AD-A135336] N84-18070
Electron ballistic effects in III-V semiconductors
[AD-A135353] N84-18072
GALLIUM PHOSPHIDES
InGaPAs by metalorganic chemical vapor deposition
[AD-A135281] N84-18069
GAME THEORY
Dynamics and control of forward swept wing aircraft
[NASA-CR-175369] N84-17172
Search algorithms and their implementation
[AD-A135154] N84-17953
A stopping rule for a multi-person cooperative game
[TR-87] N84-17981
GAMMA RAY SPECTRA
High resolution X- and gamma-ray spectroscopy of cosmic X-ray sources
[NASA-CR-175368] N84-18148
GAMMA RAYS
Journal of Research of the National Bureau of Standards. Volume 88, Number 3, May-June 1983
[PB84-115799] N84-17328
A study of the diffuse galactic gamma radiation
[NASA-TM-86055] N84-18151
GAPS
Distribution of unit pressures in universal spindle joint N84-17588
GAS DISCHARGES
Nitriding with a pulsed glow discharge
[BLL-OA-TRANS-3168-(6169.3)] N84-17335
GAS DYNAMICS
Spectral methods for the Euler equations: Chebyshev methods and shock-fitting
[NASA-CR-172295] N84-17118
Assessment of real gas effects on the prediction of the aerodynamics of high velocity Army shells
[AD-A134739] N84-17150
Universal single level implicit algorithm for gasdynamics
[NASA-CR-166531] N84-17936
GAS EXPANSION
Two-dimensional supersonic expansion flows on walls with nonequilibrium condensation N84-17125
GAS FLOW
Air Force Academy Aeronautics Digest - Fall/Winter 1982
[AD-A135073] N84-17145
Fire propagation in concurrent flows
[PB84-100155] N84-17326
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolves Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
Apparatus and method for destructive removal of particles contained in flowing fluid
[NASA-CASE-NPO-15426-1] N84-17555
GAS GENERATORS
Chemical generation and deactivation of oxygen singlet delta
[AD-A135392] N84-17308
GAS JETS
Rules governing the distribution of a gas jet in a liquid. Communication 2
[BLL-M-35437-(5828.4)] N84-17513
GAS LASERS
Modeling study of a CW HF resonance transfer laser medium
[AD-A134866] N84-17580
GAS RECOVERY
Experimental investigation concerning the feasibility of electrostatic precipitators at high pressures and temperatures — gas cleaning systems for coal conversion
[BMFT-FB-T-83-201] N84-17704
GAS TURBINE ENGINES
Aviation-fuel property effects on combustion
[NASA-CR-168334] N84-17407
GAS TURBINES
Ceramic components for gas turbines, phase 2
[BMFT-FB-T-83-198] N84-17183
Alternative fuels for general aviation
[GPO-27-618] N84-17409
Characteristics of a four nozzle, slotted mixing stack with slanted shroud, gas eductor system
[AD-A134794] N84-17547
GAS-SOLID INTERACTIONS
Shot noise generated by gas impact during a cometary fly-by --- Vega Halley's comet flyby N84-17273
GASEOUS FUELS
In vitro chlorophyll photosynthetic reaction
[PB84-104892] N84-17810
GATES (CIRCUITS)
Automated synthesis of digital hardware modules: Simulation and verification of interconnections
[AD-A135298] N84-17889
GAUGE INVARIANCE
Research in theoretical nuclear physics
[DE84-003442] N84-18038
GENERAL AVIATION AIRCRAFT
FAA (Federal Aviation Administration) statistical handbook of aviation: Calender year 1982
[PB84-127323] N84-17124
GENETICS
Biochemical indicators of thermal stress: Selected genetic and physiological parameters
[PB84-100122] N84-17808
GEOCHEMISTRY
Geological and geochemical controls on the chemical evolution of subsurface water in undisturbed and surface-mined landscapes in western North Dakota
[PB84-126952] N84-17685
GEODETIC COORDINATES
Reports on cartography and geodesy, series 1: Original reports, number 90
[ISSN-0469-4236] N84-17643
GEODYNAMICS
The importance of radio interferometry for geodynamics N84-17644
The mobile laser ranging system and its planned use in the framework of international research on geodynamics N84-17649
Earth strain measurements with the transportable laser ranging system: Field techniques and planning
[NASA-CR-175150] N84-17725
GEOGRAPHIC INFORMATION SYSTEMS
APPS-4 (Analytical Photogrammetric Processing System-4) remote sensing applications guide
[AD-A134977] N84-17676
Geography information systems project
[INPE-2782-PRE/348] N84-18100
GEOGRAPHY
Hexagonal data base study
[AD-A135532] N84-17907
GEOIDS
The delineation and interpretation of the Earth's gravity field
[NASA-CR-173310] N84-17722
GEOLOGICAL SURVEYS
Chromium
[PB84-100882] N84-17385
GEOMAGNETISM
Auroral ion acceleration
[PR-783] N84-17715
Possibility of investigation of Kimerlite pipes by superconductive geomagnetic variation measuring stations
[CSIR-TRANS-1701] N84-17724
GEOMETRY
Angle-resolved photoemission extended fine structure
[DE84-002899] N84-18080
GEOMORPHOLOGY
Empirical analysis of meandering and flow characteristics in laboratory and natural channels
[DE84-003461] N84-17679
GEOPHYSICS
Homogeneous magnitude system of the Eurasian continent: S and L waves
[PB84-101161] N84-17744
GEOS 1 SATELLITE
GEOS 1 and 2 in flight evaluation of the reaction control system
[SEP-TS/S/194/JM/30301/81(1)] N84-17242
Ion measurements on GEOS using a negatively biased sensor on a positively charged spacecraft N84-17263
GEOS 2 SATELLITE
GEOS 1 and 2 in flight evaluation of the reaction control system
[SEP-TS/S/194/JM/30301/81(1)] N84-17242
Observations of the GEOS-2 equilibrium potential and its relation to the ambient electron energy distribution N84-17256
Influence of wake and photoemission on electric field measurements with a double probe on GEOS-2 N84-17261
Comparison of thermal plasma observations on SCATHA and GEOS N84-17262
Ion measurements on GEOS using a negatively biased sensor on a positively charged spacecraft N84-17263
The DC electric field in space: Direct measurements and inferences from cold plasma drifts N84-17264
GEOSYNCHRONOUS ORBITS
The role of potential barrier formation in spacecraft charging N84-17269
GEOTECHNICAL ENGINEERING
Acoustic data and uncertainty in geotechnical site characterization offshore
[PB84-100908] N84-17801
GLASS FIBER REINFORCED PLASTICS
Flammability characteristics of some epoxy resins and composites
[AD-A135282] N84-17394
GLOBAL POSITIONING SYSTEM
Satellite-directed navigational guidance for aircraft
[H-REPT-98-510] N84-17164
Synopsis and recommendations of the TSC Workshop on differential operation of NAVSTAR GPS, June 1983
[PB84-121599] N84-17170
GLOW DISCHARGES
Vacuum ionic carburisation
[BLL-OA-TRANS-3149-(6196.3)] N84-17291
GOES SATELLITES
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773
GOGGLES
The objective evaluation of aircrew protective breathing equipment. 5: Mask/goggles combinations for female crewmembers
[AD-A134912] N84-17830
GOLD COATINGS
Tribological characteristics of gold films deposited on metals by ion plating and vapor deposition
[NASA-TM-83572] N84-17352

Protection against heat radiation in the steel industry — protective visor
[FOA-C-20500-E4] N84-17864

GOVERNMENT PROCUREMENT
Estimating the cost of composite material airframes using the Rand Corporation Development and Procurement Costs of Aircraft parametric model (DAPCA III)
[AD-A134993] N84-17120
Lessons learned--advanced attack helicopter
[AD-A135521] N84-17177
HQ AFSC selection of a microprocessor development system
[AD-A134930] N84-17891

GOVERNMENT/INDUSTRY RELATIONS
Joint industry/university cooperation with federally supported research facilities
[GPO-24-902] N84-18115

GOVERNMENTS
The national space program from the fifties into the eighties
[AD-A134799] N84-17197
Further delineation of the utilization of scientific literature by U.S. patents
[PB84-100734] N84-18095
Scientific and technical information system for the Washington State Legislature
[PB84-100650] N84-18112

GRAIN BOUNDARIES
Segregation of Zn solutes to high-angles (001) twist grain boundaries in Al
[DE84-003455] N84-17375

GRAMMARS
Inquiry semantics: A functional semantics of natural language grammar
[AD-A135153] N84-17929

GRANITE
Mechanical and transport properties of rocks at high temperatures and pressures. Task 3. Mechanical properties of rocks at high temperatures and pressures
[DE84-003438] N84-17740

GRANULAR MATERIALS
Studies on the mechanics of rapidly flowing granular-fluid materials
[AD-A135463] N84-17540

GRAPHITE
Comparison of the characteristics of graphites irradiated at 600 and 9000 deg C
[DE83-015695] N84-17297
A technique for the nondestructive detection of voids and composition anomalies in metal matrix composite wires using X or gamma rays
[AD-A135481] N84-17359

GRAPHITE-EPOXY COMPOSITES
Friction and wear behavior of aluminum and composite airplane skins
[NASA-TP-2262] N84-17175
Effects of high energy radiation on the mechanical properties of epoxy graphite fiber reinforced composites
[NASA-CR-173293] N84-17292
Effects of JP-4 fuel on Graphite/Epoxy composites
[AD-A135416] N84-17296
Embedded gage impact study
[NASA-CR-172227] N84-17558

GRATINGS (SPECTRA)
Theoretical aspects of laser-induced periodic surface structure formation
[AD-A134875] N84-17581

GRAVITATION
Principal facts for gravity stations in the Nevada portion of the Kingman 1 degree by 2 degree quadrangle
[PB84-103084] N84-17749

GRAVITATIONAL EFFECTS
Principal facts for gravity stations in the Nevada portion of the Kingman 1 degree by 2 degree quadrangle
[PB84-103084] N84-17749

GRAVITATIONAL FIELDS
The delineation and interpretation of the Earth's gravity field
[NASA-CR-173310] N84-17722

GRAVITATIONAL WAVES
A search for gravitational radiation from PSR 1937 + 214 N84-17717

GRAVITY ANOMALIES
Principal facts for gravity stations in the Nevada portion of the Kingman 1 degree by 2 degree quadrangle
[PB84-103084] N84-17749

GRAVITY WAVES
On modifications of the Zakharov equation for surface gravity waves
[AD-A135050] N84-17943

GREAT CIRCLES
Path discrepancies between great circle and rhumb line
[NASA-TM-85522] N84-17168

GREAT LAKES (NORTH AMERICA)
Mariners weather log, volume 27, number 3, summer 1983
[PB84-108356] N84-17771

GREEN FUNCTION
Applications of Non-Self-Adjoint operator theory to the Singularity Expansion Method (SEM) and to the Eigenmode Expansion Method (EEM) in acoustic and electromagnetic problems
[AD-A135177] N84-17955
A study of waves on a curved space-time N84-18083

GREENHOUSE EFFECT
Can we delay a greenhouse warming
[DE84-003390] N84-17703

GRINDING (COMMINUTION)
Influence of vibration grinding on the properties of tungsten powders and the quality of sintered pieces
[BLL-M-35373] N84-17414

GRINDING MACHINES
Aspects of the grinding process
[CSIR-TRANS-1694] N84-17416

GROUND STATIONS
Results of permanent Doppler measurements at the satellite observation station Wettzell N84-17646

GROUND SUPPORT SYSTEMS
An Attached Payload Operations Center (APOC) at the Goddard Space Flight Center (GSFC), volume 2
[NASA-CR-175160-VOL-2] N84-17203

GROUND TRUTH
Validation of SEASAT-1 altimetry using ground truth in the North Sea region
[SER-B-263-MITT-166] N84-17681

GROUND WATER
Geophysical exploration surveys for ground water in the San Pedro Basin, Arizona
[PB84-110808] N84-17684
Geological and geochemical controls on the chemical evolution of subsurface water in undisturbed and surface-mined landscapes in western North Dakota
[PB84-126952] N84-17685

GROUP DYNAMICS
A stopping rule for a multi-person cooperative game
[TR-87] N84-17981

GROUP THEORY
Class numbers and units N84-18001

GROWTH
The effect of various carbon sources on the growth of single-celled cyanophyta
[NASA-TM-77090] N84-17804

GULF STREAM
Mariners weather log, volume 27, number 3, summer 1983
[PB84-108356] N84-17771

GUN LAUNCHERS
Experimental electromagnetic launchers at MRL
[MRL-R-894] N84-17482

GUN PROPELLANTS
Expanded ignition effectiveness tests of selected igniter materials with Navy propellants
[AD-A134704] N84-17312
Intracavity laser excitation of NCO fluorescence in an atmospheric pressure flame
[AD-A134740] N84-17579

H

H LINES
Observations of emission in bright, low redshift quasars
[NASA-CR-175376] N84-18122

HABITABILITY
Extremely Low Frequency (ELF) communications system ecological monitoring program: Plan and summary of 1982 progress
[AD-A135482] N84-17445

HALIDES
Excited state kinetics of mercury halides and mixtures with N2 and Xe
[AD-A135432] N84-17310

HALLEY'S COMET
Laboratory measurement of impact ionization N84-17271
Energy distributions and yields of secondary ions and electrons emitted by GIOTTO during Halley encounter N84-17272
Shot noise generated by gas impact during a cometary fly-by — Vega Halley's comet flyby N84-17273
A model of electrostatic charging and sheath structure of GIOTTO near Halley's comet N84-17274

HANDBOOKS
Specifications, tolerances, and other technical requirements for weighing and measuring devices
[PB84-125764] N84-17572

HARBORS
West breakwater, Sines (Portugal) — conferences N84-17785
West breakwater-Sines (Portugal). Overview of rehabilitation and synthesis of project N84-17786
West breakwater-Sines (Portugal): Wave climatology N84-17787
West breakwater-Sines (Portugal): Study of armor stability N84-17788
West breakwater-Sines (Portugal): New aspects of armor units N84-17789

HARDENERS
Development of a stable epoxy resin system for composite repair
[AD-A135390] N84-17395

HARDNESS
International Conference on Recent Developments in Specialty Steels and Hard Materials N84-17348
Tempering kinetics of alloy steels as a function of quench rate and M sub s temperature
[AD-A134806] N84-17365

HARDWARE
Automated synthesis of digital hardware modules: Simulation and verification of interconnections
[AD-A135298] N84-17889

HARMONIC GENERATORS
Interaction of electromagnetic fields with plasma
[AD-A135173] N84-18054

HARMONICS
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-175380] N84-17171
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1
[AD-A135232] N84-17485
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2
[AD-A135233] N84-17486

HAZARDS
Crashworthy cyclic control stick
[AD-A135150] N84-17176
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635

HEAD-UP DISPLAYS
Head-Up Display (HUD) technology demonstration
[AD-A134695] N84-17180

HEART FUNCTION
Assessment of the functional state of the heart muscle in aircrew members by means by bicycle ergometry N84-17815

HEAT EXCHANGERS
Development of a contact heat exchanger for a constructable radiator system
[NASA-CR-171730] N84-17523
Development of a solar energy system
[DE83-014236] N84-17690
Development of a solar energy system: Executive summary
[DE83-014392] N84-17693

HEAT FLUX
Atmospheric planetary-wave response to external forcing
[NASA-CR-175165] N84-17726

HEAT MEASUREMENT
The practical use of data as to the solution enthalpies of molten Fe-V-Si
[BLL-M-35430-(5828.4)] N84-17342

HEAT PIPES
Development of a contact heat exchanger for a constructable radiator system
[NASA-CR-171730] N84-17523
High capacity heat pipe performance demonstration
[NASA-CR-171733] N84-17531

HEAT PUMPS
Heat pump units with electrically driven compressors for water heating
[BLL-OA-TRANS-3181-(6196.3)] N84-17514

HEAT RESISTANT ALLOYS
Preliminary study of thermomechanical fatigue of polycrystalline MAR-M 200
[NASA-TP-2280] N84-17350
Factors which influence directional coarsening of Gamma prime during creep in nickel-base superalloy single crystals
[NASA-TM-83595] N84-17353
Influence of composition on the microstructure and mechanical properties of a nickel-base superalloy single crystal
[NASA-TM-83563] N84-17354
Influence of cobalt, tantaum and tungsten on the high temperature mechanical properties of single crystal nickel-base superalloys
[NASA-TM-83479] N84-17355

HEAT SHIELDING
Protection against heat radiation in the steel industry --- protective visor
[FOA-C-20500-E4] N84-17864
HEAT TRANSFER
Thermal energy management process experiment
N84-17222
On the propagation laws of combustion waves in solids (pyrotechnic reactions)
[BLL-TRANS-1098-(7291.798S)] N84-17300
Considerations on the external combustion system of the Stirling hot gas engine
[NASA-TM-77026] N84-17302
Thermal-energy transport from arc to rails in an arc-driven rail gun
[AD-A134991] N84-17499
Thermocapillary flows and their stability: Effects of surface layers and combination
[NASA-CR-170962] N84-17522
Development of a contact heat exchanger for a constructable radiator system
[NASA-CR-171730] N84-17523
Acquisition systems for heat transfer measurement
[DE84-003779] N84-17551
Development of a thermal and structural model for a NASTRAN finite-element analysis of a hypersonic wing test structure
[NASA-CR-170413] N84-17620
Ocean research for understanding climatic variations: Priorities and goals for the 1980's
[PB84-105816] N84-17768
Ultra-high-field superconducting magnets
[DE84-003913] N84-18012
HEAT TREATMENT
Heat treatment and residual austenite
[CSIR-TRANS-1704] N84-17349
Development of modified 9 Cr-1 Mo steel for elevated-temperature service
[DE84-003161] N84-17372
Over-aging of aluminum alloys
[DE84-004927] N84-17382
Growth and evaluation of AgGaS2 and AgGaSe2 for infrared nonlinear applications
[NASA-CR-175185] N84-18066
HEATING
Computer models for two-dimensional transient heat conduction
[AD-A134893] N84-17549
HEAVY IONS
Power-amplification of a heavy-ion beam in an induction linac
[DE84-002911] N84-18042
Neon transport in selected organic composites --- stopping power of Kapton and polyethylene
[NASA-TM-85693] N84-18044
HEIGHT
Automatic real time ionogram scaler with true height analysis - artist
[AD-A135174] N84-17732
HELICOPTER PERFORMANCE
Rotary wing aircraft and technical publications of NASA, 1970 - 1982
[NASA-TM-85521] N84-18102
HELICOPTER WAKES
Calculation of the aerodynamic flow field in the vicinity of a Sea King helicopter
[ARL-AERO-REPT-158] N84-17128
Helicopter rotor wake geometry and its influence in forward flight. Volume 1: Generalized wake geometry and wake effect on rotor airloads and performance
[NASA-CR-3726] N84-17149
Computation of potential flows with embedded vortex rings and applications to helicopter rotor wakes
[NASA-CR-166542] N84-17526
HELICOPTERS
Sortie duration and helicopter component failures (an empirical study)
[AD-A134745] N84-17122
HELIOS SATELLITES
The celestial mechanics experiment (E 11) of HELIOS
[BMFT-FB-W-83-016] N84-18124
HELIUM
Effects of pulsed and/or dual ion irradiation on microstructural evolution in a Ti and Si modified Austenitic alloy
[DE84-003411] N84-17374
Interaction of weak shock waves and discrete gas inhomogeneities N84-17517
HELIUM ISOTOPES
Specific heat of He-3 in the Fermi-liquid region
[DE83-014858] N84-17566
Using the surface tension to estimate the condensate density of superfluid He-4
[DE83-011325] N84-18077
HELMETS
Impact response of an energy absorbing earcup
[AD-A134828] N84-17860
HERMITIAN POLYNOMIAL
Use of the Bernstein form to derive sufficient conditions for shape preserving piecewise polynomial interpolation
[DE84-003914] N84-17972
HETEROCYCLIC COMPOUNDS
Model compound studies of rigid rod aromatic heterocyclic polymer systems, the X-ray crystal structure of 2,6-diphenylbenzo (1,2-d; 5,4-d') diimidazole tetrahydrate, C20H14N4. 4H2O, a model system for the study of polymer-water interaction in polybenzimidazoles
[AD-A135278] N84-17393
HETERODYNING
Pulsed heterodyne CO2 laser/scanner system. Volume 1: Assembly report
[AD-A135059] N84-17577
Pulsed heterodyne CO2 laser/scanner system. Volume 2: Operating instructions
[AD-A135060] N84-17578
HETEROGENEITY
Signal detection for same-shape families of non-homogeneous Poisson processes
[AD-A135032] N84-17942
HETEROJUNCTIONS
Heterojunction solid-state devices for millimeter-wave sources
[AD-A135389] N84-17490
HEURISTIC METHODS
Myopic heuristics for the weighted tardiness problem on identical parallel machines
[AD-A134934] N84-17934
HF LASERS
Modeling study of a CW HF resonance transfer laser medium
[AD-A134866] N84-17580
HIERARCHIES
Application of hierarchical data structures to geographical information systems
[AD-A134999] N84-17870
Partially ordered computations with applications to VLSI design N84-17880
Hierarchical cache accumulators for sequential mode estimation
[AD-A134698] N84-17908
HIGH ENERGY INTERACTIONS
Activities in nuclear and high energy physics
N84-18043
HIGH LEVEL LANGUAGES
ATE, ATLAS and the microprocessor --- automatic test equipment (ATE); abreviated test language for all systems (ATLAS) N84-17872
Experience with a regular expression compiler
[AD-A135202] N84-17888
Computer networks without a shared memory AFOSR-81-0197
[AD-A135074] N84-17927
HIGH PASS FILTERS
An active filter primer
[AD-A134838] N84-17498
HIGH POWER LASERS
Insulator materials in high power lasers for inertial fusion: Present and future
[DE84-003738] N84-18063
HIGH PRESSURE
Emission FTIR analyses of thin microscopic patches of jet fuel residue deposited on heated metal surface
[NASA-CR-168331] N84-17410
HIGH PRESSURE OXYGEN
Explosion and fire hazards in an oil-oxygen system --- of an airplane
[FOA-C-20507-D1] N84-17159
HIGH RESOLUTION
A test strategy for high resolution image scanners
[AD-A134998] N84-18048
High resolution X- and gamma-ray spectroscopy of cosmic X-ray sources
[NASA-CR-175368] N84-18148
HIGH SPEED CAMERAS
Improvements to high speed rotating prism cameras including on board timing and event pulse generators
[MRL-TN-476] N84-17557
HIGH STRENGTH STEELS
International Conference on Recent Developments in Specialty Steels and Hard Materials N84-17348
HIGH TEMPERATURE
Method of high-temperature expansions in short-range order theory
[BLL-M-35385-(5828.4)] N84-17344
Development of modified 9 Cr-1 Mo steel for elevated-temperature service
[DE84-003161] N84-17372
Emission FTIR analyses of thin microscopic patches of jet fuel residue deposited on heated metal surface
[NASA-CR-168331] N84-17410
HIGH TEMPERATURE LUBRICANTS
Time-temperature studies of high temperature deterioration phenomena in lubricant systems: Synthetic ester lubricants
[AD-A135484] N84-17594
HIGH TEMPERATURE TESTS
Ceramic life prediction methodology - hot spin disc life program
[AD-A134783] N84-17400
HIGH VOLTAGES
The concepts of critical temperature and energy cutoff of ambient electrons in high voltage charging of spacecraft N84-17275
An experimental investigation of electric flashover across solid insulators in vacuum
[NASA-CR-175379] N84-17478
HIGHWAYS
Task conditions versus stable individual differences as determinants of experts' judgement policies
[AD-A134797] N84-17841
HISTORIES
The Prandtl Hergesell project of a National Research Establishment for Aeronautics
[DFVLR-MITT-83-10] N84-17123
The national space program from the fifties into the eighties
[AD-A134799] N84-17197
HOLLOW CATHODES
Nitriding with a pulsed glow discharge
[BLL-OA-TRANS-3168-(6169.3)] N84-17335
HOLOGRAPHY
Approach to real-time holography
[DE84-002779] N84-17565
Polarizing holographic reflector for Electron Cyclotron Resonant Heating (ECRH) on the Tandem Mirror Experiment Upgrade (TMX-U)
[DE84-003740] N84-17568
HOMOGENEITY
Homogeneity and magnetic susceptibility in some substituted cadmium spinels
[AD-A135297] N84-17357
HONING
On the use of diamond and cubical boron nitride abrasives in automatic honing applications
[CSIR-TRANS-1640] N84-17420
HOT CORROSION
The cathode material for a plasma-arc heater
[BLL-OA-TRANS-3126-(6196.3)] N84-18053
HOT PRESSING
Consolidation of Si3N4 without additives (by hot isostatic pressing)
[NASA-CR-173279] N84-17389
HOT-WIRE ANEMOMETERS
Hot-wire measurements of velocity and temperature fluctuations in a heated turbulent boundary layer
[AD-A135212] N84-17538
HOVERCRAFT GROUND EFFECT MACHINES
Design of a remotely controlled hovercraft vehicle for spill reconnaissance
[PB84-124064] N84-17187
HOVERING
Documentation of ice shapes on the main rotor of a UH-1H helicopter in hover
[NASA-CR-168332] N84-17139
HUMAN BEHAVIOR
Task differences, stylistic characteristics and physiological arousal
[AD-A134335] N84-17844
Behavioral change of blood lactate metabolism
[PB84-100171] N84-17850
HUMAN BEINGS
Review of the National Ambient Air Quality Standards for sulfur oxides: Assessment of scientific and technical information
[PB84-102920] N84-17711
Problem solving abilities
[AD-A134717] N84-17840
HUMAN BODY
Arctic personnel effects
[AD-A134892] N84-17829
HUMAN FACTORS ENGINEERING
Crashworthy cyclic control stick
[AD-A135150] N84-17176
Terminal work in the process industry: Experience in a time perspective. Part 2: A few years after the installation --- computer terminal operators
[FOA-C-56039-H2-PT-2] N84-17422
Human factors issues associated with the use of speech technology in the cockpit
[NASA-CR-166548] N84-17433
Man and machine. The role of human factors in system development
[FOA-A-56005-H2] N84-17863

HUMAN PERFORMANCE
Extending human effectiveness during sustained operations through sleep management
[AD-A134782] N84-17825
Task conditions versus stable individual differences as determinants of experts' judgement policies
[AD-A134797] N84-17841
Motivation and performance appraisal behavior
[AD-A134311] N84-17842
Effects of load, cognitive complexity and type A on satisfaction
[AD-A134415] N84-17846
Preliminary field tests for detecting flying targets in front of a land background --- ground observers
[FOA-C-56033-H2] N84-17847
Detection of flying targets in front of a land background: Laboratory tests
[FOA-C-56034-H2] N84-17848
Detection of flying targets in front of a land background: Field tests --- human observers
[FOA-C-56035-H2] N84-17849

HUMAN REACTIONS
Temporal aspects of eye movement when viewing multiple targets
[AD-A134853] N84-17828
Human reactions to transient electric currents, volume 8
[PB84-112695] N84-17834

HUMAN TOLERANCES
Effect of the microclimate on the night sleep and physical fitness of seamen during a cruise in the low latitudes N84-17813

HURRICANES
Pertinent meteorological data for hurricane Allen of 1980
[PB84-104322] N84-17766
Evaluation of the FEMA (Federal Emergency Management Agency) model for estimating potential coastal flooding from hurricanes and its application to Lee County, Florida
[PB84-105832] N84-17769

HYDRAULIC FLUIDS
Empirical analysis of meandering and flow characteristics in laboratory and natural channels
[DE84-003461] N84-17679

HYDRAULIC JETS
Development of a high pressure water jet for the rapid removal of concrete
[PB84-109909] N84-17426

HYDRAULIC TEST TUNNELS
Experimental water tunnel with density stratification for the simulation of small-scale atmospheric flows
[BLL-RISLEY-TR-4871-(9091.9F)] N84-17188

HYDRAZINE ENGINES
GEOS 1 and 2 in flight evaluation of the reaction control system
[SEP-TS/S/194/JM/30301/81(1)] N84-17242

HYDRIDES
Development of a solar energy system
[DE83-014236] N84-17690
Development of a solar energy system: Executive summary
[DE83-014392] N84-17693

HYDROCARBON COMBUSTION
Explosion and fire hazards in an oil-oxygen system --- of an airplane
[FOA-C-20507-D1] N84-17159

HYDROCARBON FUELS
Exhaust emissions from a diesel engine
[PB84-122910] N84-17713

HYDRODYNAMICS
Hydrodynamic lubrication of rigid nonconformal contacts in combined rolling and normal motion
[NASA-TM-83578] N84-17592
Light ion fusion
[DE84-003767] N84-18061

HYDROELASTICITY
La Recherche Aerospatiale bimonthly bulletin, number 1983-3, 214/May-June
[ESA-TT-822] N84-18014

HYDROGEN
Conformal solution methods based on the hard convex body expansion theory, section 1
[PB84-100940] N84-17332
Development of a solar energy system
[DE83-014236] N84-17690
De-excitation and equipartition in H2-surface collisions
[DE84-003008] N84-18031

HYDROGEN ATOMS
Atomic hydrogen maser investigations of hydrogen atom interactions from 4 K to 12 K
[AD-A134917] N84-17582

HYDROGEN MASERS
Atomic hydrogen maser investigations of hydrogen atom interactions from 4 K to 12 K
[AD-A134917] N84-17582

HYDROGEN OXYGEN ENGINES
Recommendations for future research on fracture mechanics life technology
[NASA-CR-170904] N84-17615

HYDROGEN PRODUCTION
Development of a solar energy system: Executive summary
[DE83-014392] N84-17693

HYDROGEN SULFIDE
Hydrogen sulfide provisional thermophysical properties from 188 to 700 K at pressures to 75 MPa
[PB84-122704] N84-17329

HYDROGRAPHY
Hydrographic station data of five surveys of the beta-triangle in the eastern North Atlantic, 1978 - 1981
[PB84-100874] N84-17800

HYDROLOGY
Geological and geochemical controls on the chemical evolution of subsurface water in undisturbed and surface-mined landscapes in western North Dakota
[PB84-126952] N84-17685
Proceedings of the 18th International Conference on Coastal Engineering
[ISBN-0-7988-2553-7] N84-17783

HYDROLYSIS
Hydrolysis of plastic wastes with the aim of recovering and reprocessing the starting components (recycling)
[BMFT-FB-T-83-199] N84-17322

HYDROPONICS
Inorganic analysis in a controlled ecological life support system
[NASA-CR-173299] N84-17852

HYDROXIDES
Chemical and electrochemical properties in molten alkaline hydroxides
[BLL-RISLEY-TR-4854-(9091.9F)] N84-17298
Chemical and electrochemical properties in molten alkaline hydroxides. 3: Oxide and acid complexes of some metallic cations
[BLL-RISLEY-TR-4858-(9091.9F)] N84-17299

HYDROXYL RADICALS
Technique for the rapid generation of OH radicals behind shock waves and its application to the study of combustion kinetics
[DE84-003183] N84-17317
Two photon excitation as a tool for atmospheric and kinetic research
[NASA-CR-175378] N84-18026

HYPERFINE STRUCTURE
Crystal fields and second order magnetic hyperfine interactions in TmFe2Si2
[DE84-003622] N84-18078

HYPERGOLIC ROCKET PROPELLANTS
Measurements of hypergolic fuels' and oxidants' permeation through commercial protective materials: Part 1. Inhibited red fuming nitric acid and unsymmetrical dimethylhydrazine
[AD-A134714] N84-17411

HYPERSONIC AIRCRAFT
Development of a thermal and structural model for a NASTRAN finite-element analysis of a hypersonic wing test structure
[NASA-CR-170413] N84-17620

HYPERSONIC FLOW
Assessment of real gas effects on the prediction of the aerodynamics of high velocity Army shells
[AD-A134739] N84-17150

I

ICE
A study on the tensile strength of ice as a function of grain size
[AD-A134889] N84-17631
High pressure cosmochemistry applied to major planetary interiors: Experimental studies --- phase diagram for the ammonia water system
[NASA-CR-173278] N84-18138

ICE FORMATION
Documentation of ice shapes on the main rotor of a UH-1H helicopter in hover
[NASA-CR-168332] N84-17139
Some parameters characterising the icing of ships from spray
[BLL-MO-TRANS-1570-(9022.552)] N84-17753
Status for knowledge: Meteorological affected icing on aircraft in clouds
[DFVLR-MITT-83-12] N84-17763

ICE NUCLEI
Cloud physics investigations by the University of Wyoming in HIPLEX 1977-1982
[PB84-106756] N84-17770

ICE PREVENTION
Space Shuttle ice suppression system validation, volume 1
[NASA-CR-171740] N84-17244
Space Shuttle ice suppression system validation, volume 2
[NASA-CR-171741] N84-17245
Space Shuttle ice suppression system validation, volume 3
[NASA-CR-171742] N84-17246

ICE REPORTING
Remote sensing: New satellite systems and potential applications --- conferences
[ESA-SP-205] N84-17650
Snow and ice monitoring by microwave techniques N84-17660
Remote sensing of sea ice --- Nimbus 7 scanning multichannel microwave radiometer (SMMR) N84-17664
A study of satellite radar altimeter operation over ice-covered surfaces
[ESA-CR(P)-1810] N84-17683
Report of the International Ice Patrol Service in the North Atlantic Ocean, season of 1981
[AD-A134791] N84-17793
Investigation of ice dynamics in the marginal ice zone --- Arctic Ocean
[AD-A134599] N84-17799

ICEBERGS
Report of the International Ice Patrol Service in the North Atlantic Ocean, season of 1981
[AD-A134791] N84-17793

IGNEOUS ROCKS
Shock wave properties of anorthosite and gabbro
[NASA-CR-173309] N84-17521

IGNITERS
Expanded ignition effectiveness tests of selected igniter materials with Navy propellants
[AD-A134704] N84-17312

IMAGE ANALYSIS
Design and prototype implementation of SCAN: A programming language for scene analysis N84-17893
Theory of image analysis and recognition
[AD-A135453] N84-18106

IMAGE ENHANCEMENT
Image analysis with use of range information
[FOA-C-30335-E1] N84-17979

IMAGE FURNACES
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 1: Executive summary
[ERC-RP-200-DS-009-VOL-1] N84-17423
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 2: Technical descriptions
[ERC-RP-200-DS-009-VOL-2] N84-17424

IMAGE PROCESSING
Breadboard stellar tracker system test report
[NASA-CR-170973] N84-17166
APQ-102 imaging radar digital image quality study
[NASA-CR-171738] N84-17435
Simply instrumentable and optimal digitization of analog information sources
[AD-A135124] N84-17484
Remote sensing for geology N84-17668
Approaches to radar image interpretation N84-17669
Pattern recognition and image processing review N84-17897
Standard methods for image processing. Part 4: Operating instructions for the program system
[BMVG-FBWT-83-1] N84-17915
Image analysis with use of range information
[FOA-C-30335-E1] N84-17979
A test strategy for high resolution image scanners
[AD-A134998] N84-18048
A model for ordinal filtering of digital images
[AD-A134705] N84-18052
Geography information systems project
[INPE-2782-PRE/348] N84-18100

IMAGE RECONSTRUCTION
Maximum likelihood reconstruction in emission tomography with time-of-flight information: A limited study
[AD-A135061] N84-17944

IMAGE RESOLUTION
Comparison of the information content of data from the LANDSAT 4 Thematic Mapper and the multispectral scanner
[E84-10081] N84-17641
Coastal zones inventory by high resolution satellites N84-17661
A test strategy for high resolution image scanners
[AD-A134998] N84-18048

IMAGERY
Navy tactical applications guide. Operational environmental satellites. Polar-orbiting satellites geostationary satellites, spacecraft, sensors, imagery
[AD-A135466] N84-17240

IMAGING TECHNIQUES
Image analysis with use of range information
[FOA-C-30335-E1] N84-17979
Acoustic imaging of vapor bubbles through optically non-transparent media
[DE84-003961] N84-18022
Time-varying speckle phenomena in astronomical imaging and in laser scattering N84-18118
IMMUNITY
The effect of smoking on the non-specific resistance of the organism of seamen at sea N84-17816
Changes in the T and B systems of immunity in seamen during a long cruise N84-17819
IMPACT DAMAGE
Embedded gage impact study
[NASA-CR-172227] N84-17558
IMPACT LOADS
Dynamic consolidation of ceramic powders: Practicalities, problems, and prospects
[DE84-003744] N84-17404
IMPACT STRENGTH
Effect of specimen size and nickel content on the impact properties of 12 Cr-1 MoVW ferritic steel
[DE84-003270] N84-17377
IMPACT TESTS
An experimental and numerical investigation of pressure-shear waves in 6061-T6 aluminum and alpha-titanium N84-17345
Impact response of an energy absorbing earcup
[AD-A134828] N84-17860
IMPEDANCE MATCHING
Transmission line transformers; theory and design data
[FOA-C-30327-E] N84-17503
IMPEDANCE MEASUREMENT
A program for computer-controlled impedance measurement within the microwave range --- antennas
[FOA-C-30330-E3] N84-17460
IMPURITIES
Modification of alloy surface composition by segregation processes as a means of impurity control in fusion devices
[DE84-003645] N84-17373
Muon spin rotation in solids
[NASA-CR-172789] N84-18067
IN-FLIGHT MONITORING
In-flight load testing of advanced shuttle thermal protection systems
[NASA-TM-86024] N84-17250
INCOMPRESSIBLE FLOW
Finite element method for incompressible laminar boundary layer flows N84-17126
Stability of the laminar boundary layer in a streamwise corner
[NASA-CR-173282] N84-17532
INDIA
Possible tidal modulation of the Indian monsoon onset
[AD-A135441] N84-17760
INDIUM PHOSPHIDES
Long wavelength InGaAsP/InP lasers and optoelectronic integration N84-17573
InGaPAs by metalorganic chemical vapor deposition
[AD-A135281] N84-18069
Thermal conductivity of ternary and quaternary III-V compounds
[AD-A135336] N84-18070
INDUSTRIES
A theoretical analysis of the past variations in global atmospheric composition and temperature structure N84-17754
Research and development joint ventures
[GPO-26-312] N84-18114
INERTIAL CONFINEMENT FUSION
Comparisons of hydrodynamic beam models with kinetic treatments
[DE84-003242] N84-18057
Light ion fusion
[DE84-003767] N84-18061
Insulator materials in high power lasers for inertial fusion: Present and future
[DE84-003738] N84-18063
INERTIAL UPPER STAGE
Inertial Upper Stage (IUS) Solid Rocket Motor (SRM) core flow sampling at high altitudes
[AD-A134997] N84-17288
INFECTIOUS DISEASES
The effect of smoking on the non-specific resistance of the organism of seamen at sea N84-17816
INFLATABLE SPACECRAFT
Study on large, ultralight long-life structures in space, phase 2C
[TM-EKR3] N84-17284
INFLATABLE STRUCTURES
Large inflated-antenna system N84-17234
Technical theory of pneumatic beams --- inflated beams
[FOA-C-20504-E4] N84-17634
INFORMATION DISSEMINATION
Proposed National Technical Information Service revolving fund
[PB84-103076] N84-18097
INFORMATION MANAGEMENT
EASAMS architecture for management and control systems N84-17871
Proposed National Technical Information Service revolving fund
[PB84-103076] N84-18097
INFORMATION RETRIEVAL
Microfiche Image Transmission System (MITS) demonstration field evaluation of microfacsimile
[AD-A134716] N84-17450
Problem solving abilities
[AD-A134717] N84-17840
Thermodynamics library for AFOS (Automation of Field Operations and Services) programmers (THERMO LB)
[PB84-122821] N84-17925
Proposed National Technical Information Service revolving fund
[PB84-103076] N84-18097
The program complexity of searching a table
[AD-A135299] N84-18104
Multidomain, multirecord-type Datatrieve-11 databases
[DE84-001707] N84-18110
Services for the analysis and evaluation of information
[PB84-104504] N84-18113
INFORMATION SYSTEMS
A method of measurement of behavioral factors affecting information systems design and use: An application of multidimensional scaling in uncovering individual psychological structure N84-18099
Scientific and technical information system for the Washington State Legislature
[PB84-100650] N84-18112
Services for the analysis and evaluation of information
[PB84-104504] N84-18113
INFORMATION THEORY
Nyquist frequency
[AD-A135023] N84-17440
Comparison of the information content of data from the LANDSAT 4 Thematic Mapper and the multispectral scanner
[E84-10081] N84-17641
Reasoning in multiple belief spaces N84-17894
Mutual adaptiveness of man and machine in information acquisition tasks
[AD-A135449] N84-17932
INFRARED DETECTORS
Assessment of the potential of Langmuir-Blodgett films for room temperature IR (infrared) detectors
[AD-A134616] N84-17561
Chinese journal of infrared research (Selected articles)
[AD-A135504] N84-18051
INFRARED LASERS
Long wavelength InGaAsP/InP lasers and optoelectronic integration N84-17573
Modeling study of a CW HF resonance transfer laser medium
[AD-A134866] N84-17580
INFRARED REFLECTION
Development of technologies for very thin solar cells
[BMFT-FB-W-83-024] N84-17694
INFRARED TELESCOPES
STEP flight experiments Large Deployable Reflector (LDR) telescope N84-17231
INFRASONIC FREQUENCIES
AC voltage calibrations for the 0.1 Hz to 10 Hz frequency range
[PB84-109867] N84-17570
INJECTION
Techniques for the inorganic analysis in a controlled ecological life support system N84-17853
INJURIES
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824
INLET FLOW
Theoretical and experimental engine-inlet flow fields for fighter forebodies
[NASA-TP-2270] N84-17132
INORGANIC CHEMISTRY
Techniques for the inorganic analysis in a controlled ecological life support system N84-17853
INORGANIC COMPOUNDS
Inorganic analysis in a controlled ecological life support system
[NASA-CR-173299] N84-17852
INPUT/OUTPUT ROUTINES
Control and identification of time varying systems
[AD-A135223] N84-18091
INSECTS
Estimation of temporally and spatially varying coefficients in models for insect dispersal
[AD-A135093] N84-17946
INSOLATION
Proposals for VIRA (Venus International Reference Atmosphere): Solar and thermal radiation
[PR-829] N84-18135
INSPECTION
A new technique for measuring metal surface properties at the Rayleigh critical angle
[DE84-001770] N84-17632
INSTRUMENT LANDING SYSTEMS
A comparison of two position estimate algorithms that use ILS localizer and DME information. Simulation and flight test results
[NASA-TP-2281] N84-17165
INSULATORS
Insulator materials in high power lasers for inertial fusion: Present and future
[DE84-003738] N84-18063
INTEGERS
Computational methods in number theory, part 1
[MATH-CENTRE-TRACTS-154-PT-1] N84-17990
Primality testing N84-17993
Analysis and comparison of some integer factoring algorithms N84-17995
Perfect numbers and aliquot sequences N84-17996
INTEGRAL EQUATIONS
On modifications of the Zakharov equation for surface gravity waves
[AD-A135050] N84-17943
Numerical solution of singular integral equations arising in mixed boundary value problems of elasticity
[AD-A134673] N84-17965
Numerical computation of steady state scattered sound external to submerged infinite cylinders by combining finite element and integral equation methods
[AD-A134773] N84-18020
INTEGRATED CIRCUITS
V-band integrated quadriphase modulator
[NASA-CR-175159] N84-17480
GaAs FET logic at low temperatures
[AD-A135007] N84-17483
Research in VLSI systems. Heuristic programming project and VLSI theory project. A fast turn around facility for very large scale integration (VLSI)
[AD-A134809] N84-17494
Environmental factors as a source of failure in integrated circuits N84-17604
Foundations of computer science 4. Distributed systems. Part 2: Semantics and logic
[MATH-CENTRE-TRACTS-159-PT-2] N84-17879
Partially ordered computations with applications to VLSI design N84-17880
Advanced on-board signal procesor GaAs memory
[AD-A135465] N84-17890
Luneburg lens and optical matrix algebra research
[NASA-TM-172276] N84-18047
INTEGRATED OPTICS
Luneburg lens and optical matrix algebra research
[NASA-TM-172276] N84-18047
INTERFACES
SEPAC: Spacelab Mission 1 report
[NASA-CR-170980] N84-17196
Tribological characteristics of gold films deposited on metals by ion plating and vapor deposition
[NASA-TM-83572] N84-17352
Acquisition systems for heat transfer measurement
[DE84-003779] N84-17551
Model and analysis of a communication interface with distributed processing for application in a communication network by packet switching
[INPE-2773-TDL/136] N84-17926
INTERFACIAL TENSION
Using the surface tension to estimate the condensate density of superfluid He-4
[DE83-011325] N84-18077
INTERGRANULAR CORROSION
Effects of nominal and crack-tip strain rate on IGSCC susceptibility in CERT tests
[DE84-004006] N84-17378
INTERMETALLICS
Study of intermetallic compounds in ternary systems Al-Ba-Nd and Al-Ba-Yb
[BLL-M-35387-(5828.4)] N84-17343
International Conference on Recent Developments in Specialty Steels and Hard Materials N84-17348
INTERNATIONAL COOPERATION
The remote sensing of oil pollution at sea: An attempt at synthesis N84-17662
INTERNATIONAL SUN EARTH EXPLORER 1
The potential of ISEE in different plasma environments N84-17257
Anomalously high potentials observed on ISEE N84-17258

The DC electric field in space: Direct measurements and inferences from cold plasma drifts N84-17264
Active control of the potential of ISEE-1 by an electron gun N84-17278
INTERNATIONAL SUN EARTH EXPLORER 2
The DC electric field in space: Direct measurements and inferences from cold plasma drifts N84-17264
INTERNATIONAL SUN EARTH EXPLORERS
Anomalously high potentials observed on ISEE [NASA-CR-172791] N84-17252
Anomalous behavior of ISEE-1 detected by the electron density experiment N84-17259
Magnetopause studies using data from the ISEE mission [NASA-CR-175208] N84-17718
ISEE observations of magnetopause reconnection: The energy balance N84-17720
INTERPLANETARY DUST
Formation of dust lanes in spiral galaxies by radiation pressure N84-18130
INTERPLANETARY MAGNETIC FIELDS
Evidence linking coronal mass ejections with interplanetary magnetic clouds [NASA-TM-82564] N84-18141
Interplanetary flow systems associated with cosmic ray modulation in 1977 - 1980 [NASA-TM-85120] N84-18149
Rapporteur paper for sessions MG1, MG3 and MG4: Modulation theory, interplanetary propagation and interplanetary acceleration [NASA-TM-86047] N84-18150
INTERPLANETARY MEDIUM
Power spectral signatures of interplanetary corotating and transient flows [NASA-TM-86051] N84-18131
INTERPOLATION
Evaluation of wind field interpolation schemes used in studies of regional-scale pollutant transport [DE84-003634] N84-17699
A climatically-derived global soil moisture data set for use in the GLAS atmospheric circulation model seasonal cycle experiment [NASA-CR-173289] N84-17729
Use of the Bernstein form to derive sufficient conditions for shape preserving piecewise polynomial interpolation [DE84-003914] N84-17972
INTERPROCESSOR COMMUNICATION
A distributed procedure to detect and/or deadlock [AD-A135459] N84-17904
Performance evaluation and control of distributed computer communication networks [AD-A135121] N84-17928
Distributed algorithms for various problems [AD-A135452] N84-18105
INTERSTELLAR MATTER
Limits on diffuse X-ray emission from M101 [NASA-CR-173277] N84-18147
INTERSTITIALS
Diffusion mechanisms in transition-metal oxides [DE84-003460] N84-18061
INVARIANCE
An algebraic approach to analysis and control of time-scales [AD-A135115] N84-17949
Mean field theory of the linear sigma-model: Chiral solitons [DE84-002664] N84-18034
INVERSE SCATTERING
Linear and nonlinear filtering and related inverse scattering problems [AD-A135175] N84-17954
INVERSIONS
Inversion of ringdown data for a rotating liquid cylinder [AD-A134742] N84-17546
INVERTERS
Development of a solar energy system [DE83-014236] N84-17690
INVISCID FLOW
Comparison of secondary flows predicted by a viscous code and an inviscid code with experimental data for a turning duct [NASA-TM-83575] N84-17142
IO
A dawn to dusk electric field in the Jovian magnetosphere [NASA-CR-166463] N84-18136
IODINE LASERS
Threshold kinetics of a solar-simulator-pumped iodine laser [NASA-TP-2241] N84-17575
ION ACCELERATORS
Auroral ion acceleration [PR-783] N84-17715
ION ATOM INTERACTIONS
Progress in numerical calculations of ion-atom collisions [DE84-003405] N84-18033
Learning from numerical calculations of ion-atom collisions [DE84-003265] N84-18035
ION BEAMS
Power-amplification of a heavy-ion beam in an induction linac [DE84-002911] N84-18042
ION CURRENTS
Chloride ion conductivity in a plasticized quaternary ammonium polymer [AD-A135373] N84-17305
Ionic conductivity of Li7BiO6 [AD-A135386] N84-17307
ION EXCHANGING
Pilot system for the purification of rinse water and for the recuperation of metals in electroplating companies. Pilot system metal recovery from waste water (RMA) [BMFT-FB-T-83-208] N84-17323
ION IMPACT
Impact ionization effects on Pioneer Venus Orbiter N84-17270
Laboratory measurement of impact ionization N84-17271
ION IMPLANTATION
Quantitative Secondary Ion Mass Spectroscopy (SIMS) [AD-A134195] N84-17315
Friction and wear reduction of 440C stainless steel by ion implantation [DE84-003255] N84-17371
Ion beam modification of ceramics [DE84-003302] N84-17403
ION IRRADIATION
Effects of pulsed and/or dual ion irradiation on microstructural evolution in a Ti and Si modified Austenitic alloy [DE84-003411] N84-17374
Temperature aspects of pulsed ion bombardment in an austenitic alloy [DE84-003362] N84-17376
Study of ion bombardment-induced subsurface compositional modifications in Ni-Cu alloys at elevated temperatures by ion scattering spectroscopy [DE84-003632] N84-17380
ION PLATING
Adhesion studies on ion plated TiN steel [BLL-RISLEY-TR-4880-(9091.9F)] N84-17341
Metallic glass as a temperature sensor during ion plating [NASA-TM-83566] N84-17351
Tribological characteristics of gold films deposited on metals by ion plating and vapor deposition [NASA-TM-83572] N84-17352
ION SOURCES
Ion source for a rocket payload [AD-A135051] N84-17289
Light ion fusion [DE84-003767] N84-18061
IONIC COLLISIONS
Progress in numerical calculations of ion-atom collisions [DE84-003405] N84-18033
IONIZING RADIATION
Effects of high energy radiation on the mechanical properties of epoxy graphite fiber reinforced composites [NASA-CR-173293] N84-17292
Nuclear explosion effects on telecommunication, etc. (effect of EMP and of ionizing radiation on electronics and optical electronics [FOA-C-30302-A3] N84-17458
IONOGRAMS
Automatic real time ionogram scaler with true height analysis - artist [AD-A135174] N84-17732
IONOSPHERE
Interaction of the space shuttle orbiter with the ionospheric plasma N84-17265
Electrodynamic interactions between a tethered satellite system and the ionosphere N84-17279
Auroral ion acceleration [PR-783] N84-17715
Review of radio-frequency, nonlinear effects on the ionosphere [DE84-003832] N84-17739
IONOSPHERIC ELECTRON DENSITY
Optical, radio and computer simulation studies of the Brazil ionospheric modification experiment of 8 September 1982 [AD-A135143] N84-17731
IONOSPHERIC PROPAGATION
Estimating the performance of telecommunication systems using the ionospheric transmission channel. Ionospheric communications analysis and prediction program user's manual [PB84-111210] N84-17468
IONS
Ionic conductivity of Li7BiO6 [AD-A135386] N84-17307
Ion deposited carbon coatings [AD-A135068] N84-17390
IRIDIUM
New process for recycling of rhodium and iridium from old catalysts [BMFT-FB-T-83-179] N84-17321
IRON
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility [AD-A135549] N84-17363
Velocity and electronic state distributions of sputtered Fe atoms by laser-induced fluorescence spectroscopy [DE84-003649] N84-18040
Fast diffusion of iron in single crystal rutile and iron doped rutile [DE84-004021] N84-18079
IRON ALLOYS
On the effect of fine grain size on the M sub s temperature in Fe-27Ni-0.025C alloys [AD-A134807] N84-17366
Chromium [PB84-100882] N84-17385
IRRADIATION
Dependence of thermoluminescence output on temperature during irradiation for several thermoluminescence phosphors [AD-A134940] N84-17313
IRRIGATION
Subsidence monitoring for state of Arizona [PB84-126960] N84-17750
Use of digitized radar and microcomputers to forecast local floods and irrigation needs [PB84-105568] N84-17767
ISOMERIZATION
Photochemical energy storage (photosensitized isomerization of norbornadiene to quadricyclane by copper (I) complexes) [AD-A135363] N84-17687
ISOSTATIC PRESSURE
Consolidation of Si3N4 without additives (by hot isostatic pressing) [NASA-CR-173279] N84-17389
ISOTHERMS
Thermophysical properties of gaseous carbon dioxide/water mixtures [PB84-125228] N84-17330
Deterministic chaos in materials exhibiting phase transitions [AD-A135172] N84-17537
ISOTOPES
Quantitative Secondary Ion Mass Spectroscopy (SIMS) [AD-A134195] N84-17315
The isotopic composition of energetic particles emitted from a large solar flare N84-18140
ISOTROPIC TURBULENCE
Improved turbulence models based on large eddy simulation of homogeneous, incompressible turbulent flows [NASA-CR-166541] N84-17528
ITERATION
Considerations on the external combustion system of the Stirling hot gas engine [NASA-TM-77026] N84-17302
Matrix-free methods in the solution of stiff systems of ODE's [DE84-003361] N84-17974
ITERATIVE SOLUTION
A multigrid method and a combined multigrid-conjugate gradient method for elliptic problems with strongly discontinuous coefficients in general domains [PUBL-604-REV.] N84-17980

J

JAMMING
Jam-resistant speech encoding [AD-A134707] N84-17448
Capacity of mismatched Gaussian channels [AD-A134982] N84-17455
JAPAN
ONR Far East Scientific Bulletin. Volume 8, no. 3, July - September 1983 [AD-A134272] N84-18109

JET ENGINE FUELS
Aviation-fuel property effects on combustion
[NASA-CR-168334] N84-17407
JET FLOW
Experimental investigation of the turbulent axisymmetric jet N84-17518
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 1: Two-dimensional laser Doppler anemometer studies of isothermal flowfield in a ducted centerbody combustor
[AD-A134691] N84-17542
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 2: Numerical predictions of isothermal flowfields in a ducted centerbody combustor
[AD-A134692] N84-17543
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolves Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
JOINING
Testability of interconnection structures
[AD-A135431] N84-17607
JOINTS (JUNCTIONS)
Distribution of unit pressures in universal spindle joint N84-17588
Quality assurance of heat-fused polyethylene plastic pipe joints, phase 2
[PB84-104942] N84-17608
JP-4 JET FUEL
Rationale for a Threshold Limit Value (TLV)R for JP-4/Jet B wide cut aviation turbine fuel
[AD-A134814] N84-17827
JUDGMENTS
Task conditions versus stable individual differences as determinants of experts' judgement policies
[AD-A134797] N84-17841
JUPITER (PLANET)
Charging effects observed on Voyager 1 near Jupiter N84-17260
JUPITER ATMOSPHERE
A dawn to dusk electric field in the Jovian magnetosphere
[NASA-CR-166463] N84-18136

K

KALMAN FILTERS
Study on optimal tracking strategy --- satellite tracking
[GMV-211/83] N84-17243
Linear and nonlinear filtering and related inverse scattering problems
[AD-A135175] N84-17954
KAPTON (TRADEMARK)
Eddy current thickness gauge for reel-to-reel tape processes
[DE84-004050] N84-17567
Neon transport in selected organic composites --- stopping power of Kapton and polyethylene
[NASA-TM-85693] N84-18044
KEPLER LAWS
Milgrom's revision of cosmic dynamics: Amending Newton's laws or Keplers?
[NASA-TM-86049] N84-18132
KINEMATICS
Investigation of ice dynamics in the marginal ice zone --- Arctic Ocean
[AD-A134599] N84-17799
Kinematics and dynamics of multi-rigid-body open-chain systems: Application to robot manipulators N84-17851
KINETIC ENERGY
Kinetic energy in the northern hemisphere during the FGGE (First GARP Global Experiment) year
[AD-A135382] N84-17759
KINETICS
Tempering kinetics of alloy steels as a function of quench rate and M sub s temperature
[AD-A134806] N84-17365
Precipitation mechanisms in aluminum-lithium alloys
[AD-A134836] N84-17367

L

LABORATORIES
RLE (Research Laboratory of Electronics)
[AD-A134512] N84-17495
LABORATORY EQUIPMENT
Quantitative Secondary Ion Mass Spectroscopy (SIMS)
[AD-A134195] N84-17315
LACTATES
Behavioral change of blood lactate metabolism
[PB84-100171] N84-17850
LAGUERRE FUNCTIONS
Validation methods for mathematical models of flexible satellite dynamics
[ESA-CR-(P)-1794] N84-17241
LAMINAR BOUNDARY LAYER
Stability of the laminar boundary layer in a streamwise corner
[NASA-CR-173282] N84-17532
LAMINAR FLOW
Finite element method for incompressible laminar boundary layer flows N84-17126
Finite analytic numerical solutions of laminar and turbulent convective heat transfer for pipe flow past a cavity N84-17515
Vapor-liquid phase separator studies
[NASA-CR-168545] N84-17527
LAMINATES
Effects of JP-4 fuel on Graphite/Epoxy composites
[AD-A135416] N84-17296
Embedded gage impact study
[NASA-CR-172227] N84-17558
Evaluation of a biaxial test fixture
[AD-A134845] N84-17629
LAND ICE
Snow and ice monitoring by microwave techniques N84-17660
LAND USE
Remote sensing: New satellite systems and potential applications --- conferences
[ESA-SP-205] N84-17650
Typical SPOT data and products: Potential applications N84-17653
Land use inventory and statistical sampling in agriculture --- spaceborne remote sensing N84-17658
Remote sensing from space for forestry purposes N84-17659
Remote sensing for agriculture and land use N84-17666
Northeast Scotland coastal field guide and geographical essays
[AD-A134861] N84-17674
LANDAU DAMPING
Thresholds of Raman backscatter: Effects of collisions and Landau damping
[DE84-003736] N84-18060
LANDSAT SATELLITES
Current trends and research challenges in land remote sensing N84-17651
Estimation of small area populatons using remote sensing and other approaches
[DE84-003404] N84-17678
Test of the use of LANDSAT imagery to detect changes in the area of forest in the tropics
[DE84-004444] N84-17680
LANDSAT 4
Comparison of the information content of data from the LANDSAT 4 Thematic Mapper and the multispectral scanner
[E84-10081] N84-17641
LARGE SPACE STRUCTURES
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
Deployable beam flight experiment (MAST) N84-17218
The STEP/STACBEAM experiment technology development for very large solar array deployers N84-17220
General requirements for Shuttle flight experiments N84-17221
Photovoltaic concentrator pointing dynamics and plasma interaction study N84-17224
Low concentration ratio solar array structural configuration N84-17225
Development of Test Article Building Block (TABB) for deployable platform systems N84-17226
A deployable structure and solar array controls experiment for STEP N84-17227
Vibration isolation technology experiment N84-17228
Integrated Power/Attitude Control System (IPACS) technology experiment N84-17229
Investigation of articulated panel dynamics N84-17230
Large deployable antenna flight experiment for the Space Technology Experiments Platform (STEP) N84-17232
The 55-meter-structure flight experiment N84-17233
Proceedings of the Air Force Geophysics Laboratory Workshop on Natural Charging of Large Space Structures in Near Earth Polar Orbit
[AD-A134894] N84-17281
Study on large, ultralight long-life structures in space, phase 2C
[TM-EKR3] N84-17284
Selection of noisy sensors and actuators for regulation of linear systems --- large space structures
[AD-A135442] N84-17931
LASER ANEMOMETERS
Investigation of flow phenomena in a transonic fan rotor using laser anemometry
[NASA-TM-83555] N84-17143
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 1: Two-dimensional laser Doppler anemometer studies of isothermal flowfield in a ducted centerbody combustor
[AD-A134691] N84-17542
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 2: Numerical predictions of isothermal flowfields in a ducted centerbody combustor
[AD-A134692] N84-17543
LASER APPLICATIONS
Structural and electrochemical properties of platinum-titanium laser surface alloys N84-17346
Model mission study for laser synchronization of clocks
[SNIAS-221-CA/LP] N84-17569
Two photon excitation as a tool for atmospheric and kinetic research
[NASA-CR-175378] N84-18026
LASER DOPPLER VELOCIMETERS
Photon-burst correlation techniques for atmospheric crosswind measurements
[AD-A134617] N84-17735
LASER INTERFEROMETRY
A search for gravitational radiation from PSR 1937 + 214 N84-17717
Time-varying speckle phenomena in astronomical imaging and in laser scattering N84-18118
LASER MATERIALS
Insulator materials in high power lasers for inertial fusion: Present and future
[DE84-003738] N84-18063
LASER OUTPUTS
Threshold kinetics of a solar-simulator-pumped iodine laser
[NASA-TP-2241] N84-17575
The evolution of spontaneous and coherent radiation in the free electron laser oscillator
[AD-A134458] N84-17583
Radially resolved simulation of a high-gain free electron laser amplifier
[DE84-003751] N84-17585
Suggested state regulations for control fo radiation. Volume 2: Nonionizing radiation, lasers
[PB84-109669] N84-17587
LASER PLASMAS
Beam front accelerators
[DE84-003709] N84-18032
LASER PUMPING
Threshold kinetics of a solar-simulator-pumped iodine laser
[NASA-TP-2241] N84-17575
Theoretical studies of solar-pumped lasers
[NASA-CR-173283] N84-17576
Modeling study of a CW HF resonance transfer laser medium
[AD-A134866] N84-17580
LASER RANGE FINDERS
The mobile laser ranging system and its planned use in the framework of international research on geodynamics N84-17649
Earth strain measurements with the transportable laser ranging system: Field techniques and planning
[NASA-CR-175150] N84-17725
LASER SPECTROSCOPY
Detection of elements in biomedical fluids by laser-induced breakdown spectroscopy
[DE84-003838] N84-17319
Combustion gas spectroscopy using tunable lasers
[DE84-004976] N84-17320
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolves Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
LATHES
Desk-top computer controlled instrument lathe for machining with high form accuracy
[FOA-C-30339-E1,E3] N84-17918
LATIN SQUARE METHOD
Measurement of robot accuracy using the Latin Square Three-Dimensional Ball Plate
[DE84-004920] N84-17862
LAUNCH VEHICLES
Space commercialization
[GPO-26-498] N84-17194

LAW (JURISPRUDENCE)
Report of the 68th National Conference on Weights and Measures 1983
[PB84-110998] N84-17425
LAYOUTS
Nonparametric selection procedures for a two-way layout problem
[AD-A135385] N84-17962
LEADING EDGES
Calculating C-grids with fine and embedded mesh regions
[CFDL-TR-83-7] N84-18090
LEAKAGE
The Shock and Vibration Digest, volume 15, no. 9
[AD-A134750] N84-17609
Leakage flow-induced vibrations of reactor components N84-17611
LEARNING
Proceedings of the Conference on Joint Problem Solving and Microcomputers
[AD-A135001] N84-17901
LEAST SQUARES METHOD
Effects of nominal and crack-tip strain rate on IGSCC susceptibility in CERT tests
[DE84-004006] N84-17378
LESIONS
The response of rats to cutaneous dosing with trichothecene mycotoxins
[MRL-R-902] N84-17803
LIBRARIES
Meteorological applications library (CRH.LB)
[PB84-122639] N84-17776
LIFE SCIENCES
Research and technology report, 1983
[NASA-TM-85865] N84-18152
LIFE SUPPORT SYSTEMS
Inorganic analysis in a controlled ecological life support system
[NASA-CR-173299] N84-17852
LIFT
A recontoured, upper surface designed to increase the maximum lift coefficient of a modified NACA 65 (0.82) (9.9) airfoil section
[NASA-TM-85855] N84-17144
LIFT DEVICES
The 2-dimensional inextensible lifting membrane airfoil, theory and experiment
[AD-A135251] N84-17147
LIFTING BODIES
The 2-dimensional inextensible lifting membrane airfoil, theory and experiment
[AD-A135251] N84-17147
LIGHT EMITTING DIODES
Improvements to high speed rotating prism cameras including on board timing and event pulse generators
[MRL-TN-476] N84-17557
An optical proximity sensor for measuring surface position and orientation for robot manipulation
[AD-A134899] N84-17861
LIGHT SCATTERING
Time-varying speckle phenomena in astronomical imaging and in laser scattering N84-18118
LIKELIHOOD RATIO
Detection of abrupt changes in dynamic systems
[NASA-CR-173217] N84-17988
LIMBS (ANATOMY)
Studies of electrically stimulated rat limb and peripheral nerve regeneration
[AD-A134358] N84-17806
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824
LIMITERS (FUSION REACTORS)
Research on modeling of FED/INTOR radio-frequency heating and studies of FED/INTOR impurity-control mechanisms
[DE83-016756] N84-18056
LINE SPECTRA
Turbulence and mass motion in galactic molecular clouds N84-18129
LINEAR ACCELERATORS
Linear inductive accelerator
[AD-A135547] N84-18029
Power-amplification of a heavy-ion beam in an induction linac
[DE84-002911] N84-18042
LINEAR EQUATIONS
Numerical methods for singular perturbation problems
[AD-A134696] N84-17966
A multigrid method and a combined multigrid-conjugate gradient method for elliptic problems with strongly discontinuous coefficients in general domains
[PUBL-604-REV.] N84-17980
LINEAR FILTERS
Identification of a class of filtered Poisson processes
[AD-A134970] N84-17969
LINEAR SYSTEMS
Selection of noisy sensors and actuators for regulation of linear systems — large space structures
[AD-A135442] N84-17931
Algorithms, modeling and estimation for linear systems
[AD-A135134] N84-17951
LINGUISTICS
Inquiry semantics: A functional semantics of natural language grammar
[AD-A135153] N84-17929
LIQUID CRYSTALS
Head-Up Display (HUD) technology demonstration
[AD-A134895] N84-17180
LIQUID FLOW
Empirical analysis of meandering and flow characteristics in laboratory and natural channels
[DE84-003461] N84-17679
LIQUID OXYGEN
SSME structural dynamic model development
[NASA-CR-170960] N84-17287
LIQUID PHASES
Time-temperature studies of high temperature deterioration phenomena in lubricant systems: Synthetic ester lubricants
[AD-A135464] N84-17594
LIQUID PROPELLANT ROCKET ENGINES
Orbital propulsion module system configuration study. Volume 1: Executive summary
[S/DT/YA-25-030-VOL-1] N84-17282
Orbital propulsion module system configuration study, volume 2
[S/DT/YA-25-030-VOL-2] N84-17283
LIQUID-VAPOR INTERFACES
Vapor-liquid phase separator studies
[NASA-CR-166545] N84-17527
LIQUIDS
Rules governing the distribution of a gas jet in a liquid. Communication 2
[BLL-M-35437-(5828.4)] N84-17513
LITHIUM ALLOYS
Precipitation mechanisms in aluminum-lithium alloys
[AD-A134836] N84-17367
Fundamental mathematical principles for electrochemical engineering
[DE84-002181] N84-17975
LITHIUM CHLORIDES
Behavior of an aromatic heterocyclic polymer in salt solution
[AD-A134865] N84-17401
LITHIUM OXIDES
Ionic conductivity of Li7BiO6
[AD-A135386] N84-17307
LITHOLOGY
Lithological characterization of crystalline basement rock provinces of the interior of the United States
[NASA-CR-175180] N84-17727
LOAD TESTS
In-flight load testing of advanced shuttle thermal protection systems
[NASA-TM-86024] N84-17250
LOADS (FORCES)
Loads and aeroelasticity division research and technology accomplishments for FY 1983 and plans for FY 1984
[NASA-TM-85740] N84-17135
Airloads research study. Volume 1: Flight test loads acquisition
[NASA-CR-170409] N84-17173
Airloads research study. Volume 2: Airload coefficients derived from wind tunnel data
[NASA-CR-10410] N84-17174
Adhesion studies on ion plated TiN steel
[BLL-RISLEY-TR-4880-(9091.9F)] N84-17341
Adaptation of two-dimensional transonic analysis code, TSFOIL, for use in modeling adaptive wall test sections N84-18089
LOGIC
Knowledge representation and natural-language semantics
[AD-A135476] N84-17905
LOGIC CIRCUITS
GaAs FET logic at low temperatures
[AD-A135007] N84-17483
Knowledge representation and natural-language semantics
[AD-A135476] N84-17905
LOGIC DESIGN
Knowledge representation and natural-language semantics
[AD-A135476] N84-17905
Journal on Numerical Methods and Computer Applications (selected articles)
[AD-A134752] N84-17967
LOGISTICS MANAGEMENT
Lessons learned--advanced attack helicopter
[AD-A135521] N84-17177
An approach to the design of a management information system: Development procedure for the Indonesian defense logistics staff
[AD-A134974] N84-18108
LONG TERM EFFECTS
A new dimension in space experimentation
[NASA-NF-140] N84-17210
LONG WAVE RADIATION
Analysis of longwave radiation for the Earth-atmosphere system
[NASA-CR-173155] N84-17437
Determination of the planetary radiation budget from TIROS-N satellites
[PB84-100916] N84-17748
LOOPS
Simulation of natural convection in a rectangular loop using finite elements
[DE84-003477] N84-17550
LOW ALTITUDE
Visual cues in the simulation of low-level flight
[AD-A135461] N84-17839
LOW PASS FILTERS
An active filter primer
[AD-A134838] N84-17498
LOW PRESSURE
Vacuum ionic carburisation
[BLL-OA-TRANS-3149-(6196.3)] N84-17291
LOW TEMPERATURE
Equation of state of fluid NH-3 from P-V-T and ultrasound measurements to 12 kbar
[DE83-015913] N84-17316
Arctic personnel effects
[AD-A134892] N84-17829
LUBRICANTS
The ball bearing as a rheological test device
[NASA-TM-83570] N84-17591
LUBRICATING OILS
Study of the lubrication mechanism of thin film lubricated concentrated steel contacts. The influence of pre-treatment of the steel on the load carrying capacity
[AD-A135067] N84-17593
LUBRICATION
Study of the lubrication mechanism of thin film lubricated concentrated steel contacts. The influence of pre-treatment of the steel on the load carrying capacity
[AD-A135067] N84-17593
LUMINOSITY
Determination of individual temperatures and luminosities in eclipsing binary star systems
[AD-A134182] N84-18133
Stability of the low degree 5 minute solar oscillations
[DE84-003786] N84-18143
LUMINOUS INTENSITY
The effect of various carbon sources on the growth of single-celled cyanophyta
[NASA-TM-77090] N84-17804
LUNAR GEOLOGY
Space research in Switzerland N84-17200
LUNAR TIDES
Possible tidal modulation of the Indian monsoon onset
[AD-A135441] N84-17760
LYMAN ALPHA RADIATION
Observations of emission in bright, low redshift quasars
[NASA-CR-175376] N84-18122
LYMPHOCYTES
Changes in the T and B systems of immunity in seamen during a long cruise N84-17819

M

MACH NUMBER
Assessment of real gas effects on the prediction of the aerodynamics of high velocity Army shells
[AD-A134739] N84-17150
Correlations of supersonic boundary-layer transition on cones including effects of large axial variations in wind-tunnel noise
[NASA-TP-2229] N84-17534
MACHINING
The use of diamond core saws in the electronics industry
[CSIR-TRANS-1702] N84-17417
Precision flexible machining cells within a manufacturing system
[AD-A134864] N84-17595
Flexible conformable clamps for a machining cell with applications to turbine blade machining
[AD-A134942] N84-17596
MAGNESIUM CHLORIDES
Process and cell arrangement for producing difficult to reduce elements by fused salt electrolysis
[BLL-OA-TRANS-3137-(6196.3)] N84-17339

MAGNETIC COILS
Design, construction and test of a 0.61-meter-diameter, epoxy impregnated superconductive magnet
[AD-A135339] N84-18009
MAGNETIC DIPOLES
Theory of dynamic ferroelectricity
[DE84-002609] N84-17500
MAGNETIC DISTURBANCES
A new model of the geomagnetic variation in the upper atmosphere
[AD-A135210] N84-17733
MAGNETIC FIELD CONFIGURATIONS
Magnetopause studies using data from the ISEE mission
[NASA-CR-175208] N84-17718
Magnetic field reconnection at the magnetopause: An overview N84-17719
MAGNETIC FIELDS
Development of power system measurements
[PB84-109891] N84-17509
ISEE observations of magnetopause reconnection: The energy balance N84-17720
Studies of electrically stimulated rat limb and peripheral nerve regeneration
[AD-A134358] N84-17806
Form coefficient for the field of a superconducting synchronous machine
[AD-A134751] N84-18010
Calculating the magnetic field from a saddle-shaped coil without a ferromagnetic circuit
[AD-A134776] N84-18011
MAGNETIC PERMEABILITY
Homogeneity and magnetic susceptibility in some substituted cadmium spinels
[AD-A135297] N84-17357
Specific heat of He-3 in the Fermi-liquid region
[DE83-014858] N84-17566
MAGNETIC PROBES
Precisely aligned internal magnetic probes for the reversed-field pinch experiment, ZT-40
[DE84-003704] N84-18058
MAGNETIC PROPERTIES
Crystal fields and second order magnetic hyperfine interactions in TmFe2Si2
[DE84-003622] N84-18078
MAGNETIC SUSPENSION
National Bureau of Standards Journal of Research, volume 88, no. 4, July - August 1983
[PB84-115849] N84-17571
MAGNETIC TAPES
Eddy current thickness gauge for reel-to-reel tape processes
[DE84-004050] N84-17567
MAGNETO-OPTICS
Advanced filter technology
[AD-A135446] N84-18050
MAGNETOHYDRODYNAMIC STABILITY
Electron acceleration in the front of intense collisionless shock waves
[PR-813] N84-17511
Proposed second harmonic acceleration system for the intense pulsed neutron source rapid cycling synchrotron
[DE84-003601] N84-18036
Thresholds of Raman backscatter: Effects of collisions and Landau damping
[DE84-003736] N84-18060
MAGNETOHYDRODYNAMICS
Comparisons of hydrodynamic beam models with kinetic treatments
[DE84-003242] N84-18057
MAGNETOPAUSE
Magnetopause studies using data from the ISEE mission
[NASA-CR-175208] N84-17718
Magnetic field reconnection at the magnetopause: An overview N84-17719
MAGNETOSPHERE
Space research in Switzerland N84-17200
The potential of ISEE in different plasma environments N84-17257
Ion measurements on GEOS using a negatively biased sensor on a positively charged spacecraft N84-17263
A potential control method for thermal plasma measurements on the DE-1 spacecraft N84-17276
Nonlinear mode coupling theory of the lower-hybrid-drift instability
[AD-A135538] N84-17734
A dawn to dusk electric field in the Jovian magnetosphere
[NASA-CR-166463] N84-18136
MAGNETOSPHERIC INSTABILITY
Nonlinear mode coupling theory of the lower-hybrid-drift instability
[AD-A135538] N84-17734
MAGNITUDE
Homogeneous magnitude system of the Eurasian continent: S and L waves
[PB84-101161] N84-17744
Summary of earthquake intensity file: A computerized file of the effects of earthquakes in the United States
[PB84-101443] N84-17745
MAIN SEQUENCE STARS
Narrow-band photometry of faint red stars, 2
[BULL-191] N84-18126
MAINTENANCE
Handbook for broadband isotropic antenna system. Volume 1: Operation manual
[PB84-101948] N84-17510
Software maintenance on FORTRAN libraries at a large computer installation
[DE84-002008] N84-17914
MAN MACHINE SYSTEMS
Aircrew training devices: Utility and utilization of advanced instructional features. Phase I: Tactical Air Command
[AD-A135052] N84-17190
Man and machine. The role of human factors in system development
[FOA-A-56005-H2] N84-17863
EASAMS architecture for management and control systems N84-17871
Proceedings of the Conference on Joint Problem Solving and Microcomputers
[AD-A135001] N84-17901
The effect of locus of control on performance with man-machine dialogues N84-18098
MANAGEMENT INFORMATION SYSTEMS
A program for developing automated scientific-information processing in maritime economy
[AD-A135518] N84-18107
An approach to the design of a management information system: Development procedure for the Indonesian defense logistics staff
[AD-A134974] N84-18108
MANAGEMENT METHODS
Mini-Seminar on Quality Assurance
[CSIR-TSD-0008/82] N84-17600
Quality management in procurement N84-17601
MANAGEMENT PLANNING
Identification of bottlenecks and capacity constraints in F-14, F-15, F-16, and F/A-18 aircraft production
[AD-A134629] N84-17121
Measuring quality achievements N84-17605
A strategy for improving overhead cost control
[AD-A134661] N84-18092
MANAGEMENT SYSTEMS
Management input in quality N84-17602
Design QA on a small batch project N84-17603
MANGANESE
Synthesis and characterization of binuclear Schiff base complexes of nickel, copper, and manganese
[AD-A135493] N84-17360
MANGANESE ALLOYS
Aluminum-manganese plating from a molten salt bath
[AD-A135240] N84-17356
MANIPULATORS
Kinematics and dynamics of multi-rigid-body open-chain systems: Application to robot manipulators N84-17851
MANUFACTURING
Precision flexible machining cells within a manufacturing system
[AD-A134864] N84-17595
Use of small crack data to bring about and quantify improvements to aircraft structural integrity
[AD-A135012] N84-17623
Further delineation of the utilization of scientific literature by U.S. patents. Appendices A: Distribution of references contained in patents to various sources
[PB84-100742] N84-18096
MANY BODY PROBLEM
Formulae for configuration averages of products of 1-body and 2-body operators in many-fermion spaces
[DE84-002634] N84-17971
MAPPING
Reports on cartography and geodesy, series 1: Original reports, number 90
[ISSN-0469-4236] N84-17643
Remote sensing from space for forestry purposes N84-17659
The classifications of metamorphic rocks and their applications to air photo interpretation procedures
[AD-A134965] N84-17675
Evaluation of the FEMA (Federal Emergency Management Agency) model for estimating potential coastal flooding from hurricanes and its application to Lee County, Florida
[PB84-105832] N84-17769
Hexagonal data base study
[AD-A135532] N84-17907
MAPS
An airborne programmable digital to video converter
[AD-A134839] N84-17181
Application of hierarchical data structures to geographical information systems
[AD-A134999] N84-17670
The delineation and interpretation of the Earth's gravity field
[NASA-CR-173310] N84-17722
Advanced edit system
[AD-A134952] N84-17913
MARANGONI CONVECTION
Thermocapillary flows and their stability: Effects of surface layers and combination
[NASA-CR-170962] N84-17522
MARINE BIOLOGY
Applications for fisheries — satellite remote sensing N84-17663
Biochemical indicators of thermal stress: Selected genetic and physiological parameters
[PB84-100122] N84-17808
MARINE METEOROLOGY
Mariners weather log, volume 27, number 3, summer 1983
[PB84-108356] N84-17771
Sea salt aerosol, atmospheric radon and meteorological observations in the western South Atlantic Ocean (February 1981)
[AD-A134792] N84-17794
MARINE RESOURCES
Applications for fisheries — satellite remote sensing N84-17663
MARINE TECHNOLOGY
Proceedings of the 18th International Conference on Coastal Engineering
[ISBN-0-7988-2553-7] N84-17783
MARKING
Report of the 68th National Conference on Weights and Measures 1983
[PB84-110998] N84-17425
MARKOV PROCESSES
Markov decision processes with continuous time parameter
[MATH-CENTRE-TRACTS-164] N84-17940
MARTENSITIC TRANSFORMATION
On the effect of fine grain size on the M sub s temperature in Fe-27Ni-0.025C alloys
[AD-A134807] N84-17366
MASS
Stability of the low degree 5 minute solar oscillations
[DE84-003786] N84-18143
MASS SPECTROSCOPY
Quantitative Secondary Ion Mass Spectroscopy (SIMS)
[AD-A134195] N84-17315
Mass spectrometric decomposition studies on several azido and nitrato polymers, thermal plasticizers and novel nitramines
[AD-A134636] N84-17398
A new model of the geomagnetic variation in the upper atmosphere
[AD-A135210] N84-17733
MASS TRANSFER
Mass and momentum turbulent transport experiments with confined swirling coaxial jets
[NASA-CR-168252] N84-17530
MATERIALS RECOVERY
New process for recycling of rhodium and iridium from old catalysts
[BMFT-FB-T-83-179] N84-17321
Pilot system for the purification of rinse water and for the recuperation of metals in electroplating companies. Pilot system metal recovery from waste water (RMA)
[BMFT-FB-T-83-208] N84-17323
MATERIALS SCIENCE
NBS (National Bureau of Standards): Materials measurements — space processing experiments
[NASA-CR-173162] N84-17384
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 1: Executive summary
[ERC-RP-200-DS-009-VOL-1] N84-17423
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 2: Technical descriptions
[ERC-RP-200-DS-009-VOL-2] N84-17424
MATHEMATICAL LOGIC
Verification of concurrent programs: A temporal proof system N84-17884
MATHEMATICAL MODELS
Project DELUGE: A proposed mathematical model for the Holloman AFB test track simulated rainfield
[AD-A134891] N84-17207
Contributions to satellite sheath and wake modeling N84-17266
Method of high-temperature expansions in short-range order theory
[BLL-M-35385-(5828.4)] N84-17344

Analysis of longwave radiation for the Earth-atmosphere system
[NASA-CR-173155] N84-17437
FM spectral modeling and FDM/FM simulation programs
[PB84-118934] N84-17469
Thermal-energy transport from arc to rails in an arc-driven rail gun
[AD-A134991] N84-17499
Infrared heating
[BLL-OA-TRANS-3121-(6196.3)] N84-17512
A new model of the geomagnetic variation in the upper atmosphere
[AD-A135210] N84-17733
A model for simulation of a fluctuating plume
[FOA-C-40165-A1(C1)] N84-17741
Foundations of computer science 4. Distributed systems. Part 2: Semantics and logic
[MATH-CENTRE-TRACTS-159-PT-2] N84-17879
Processes and the denotational semantics of concurrency N84-17881
The fairness problem and nondeterministic computing networks N84-17883
Algorithms, modeling and estimation for linear systems
[AD-A135134] N84-17951
Identification of a class of filtered Poisson processes
[AD-A134970] N84-17969
Virtual cathode oscillations
[AD-A135120] N84-18027
Numerical simulations of the NRL collective particle accelerator
[AD-A135533] N84-18028
Learning from numerical calculations of ion-atom collisions
[DE84-003265] N84-18035
Research on modeling of FED/INTOR radio-frequency heating and studies of FED/INTOR impurity-control mechanisms
[DE83-016756] N84-18056

MATRICES (MATHEMATICS)
Convergence of quadratic forms in p-stable random variables and theta sub p-radonifying operators
[AD-A135314] N84-17959
The discrete convolution method for solving some large moment matrix equations
[AD-A135420] N84-18007
La Recherche Aerospatiale, bimonthly bulletin number 1983-2, 213/March-April
[ESA-TT-817] N84-18013

MAXIMUM LIKELIHOOD ESTIMATES
Maximum likelihood reconstruction in emission tomography with time-of-flight information: A limited study
[AD-A135061] N84-17944
Estimation for infinite dimensional Ornstein-Uhlenbeck processes
[AD-A135372] N84-17961

MAXWELL EQUATION
Theoretical aspects of laser-induced periodic surface structure formation
[AD-A134875] N84-17581

MAXWELL-BOLTZMANN DENSITY FUNCTION
The concepts of critical temperature and energy cutoff of ambient electrons in high voltage charging of spacecraft N84-17275

MAYPOLE ANTENNAS
Spline-based estimation techniques for parameters in elliptic distributed systems
[NASA-TM-85439] N84-17947

MEASURE AND INTEGRATION
Algorithm for the detection and integration of highly oscillatory ordinary differential equations using a generalized unified modifiec divided difference representation
[DE84-003585] N84-17978
Form coefficient for the field of a superconducting synchronous machine
[AD-A134751] N84-18010

MEASUREMENT
NBS (National Bureau of Standards): Materials measurements --- space processing experiments
[NASA-CR-173162] N84-17384
Flight measurement and analysis of AAFE RADSCAT wind speed signature of the ocean
[NASA-TM-85646] N84-17784

MEASURING INSTRUMENTS
Quality assurance of heat-fused polyethylene plastic pipe joints, phase 2
[PB84-104942] N84-17606

MECHANICAL DRIVES
Electrical-shock prevention. Volume 3: Fault protection for motion-drive equipment
[PB84-102961] N84-17867

MECHANICAL PROPERTIES
Effects of high energy radiation on the mechanical properties of epoxy graphite fiber reinforced composites
[NASA-CR-173293] N84-17292
Composite structural materials
[NASA-CR-173259] N84-17293
Effects of JP-4 fuel on Graphite/Epoxy composites
[AD-A135416] N84-17296
Heat treatment and residual austenite
[CSIR-TRANS-1704] N84-17349
Influence of cobalt, tantaum and tungsten on the high temperature mechanical properties of single crystal nickel-base superalloys
[NASA-TM-83479] N84-17355
The change of the mechanical properties of steel strip in processing lines
[BMFT-FB-T-83-178] N84-17383
Specifications, tolerances, and other technical requirements for weighing and measuring devices
[PB84-125764] N84-17572

MECHANICAL SHOCK
Electrical-shock prevention. Volume 3: Fault protection for motion-drive equipment
[PB84-102961] N84-17867

MEDICAL SCIENCE
Military Medical Journal, no. 7, 1983
[L-2456] N84-17811
Military Medical Journal, no. 2, 1983
[L-2341] N84-17814

MEDITERRANEAN SEA
Mariners weather log, volume 27, number 3, summer 1983
[PB84-108356] N84-17771

MELTING
Probable maximum precipitation and snowmelt criteria for southeast Alaska
[PB84-104371] N84-17777

MELTS (CRYSTAL GROWTH)
Production of titanium powders by the electrolysis of chloride-fluoride melts with a soluble anode
[BLL-OA-TRANS-3136-(6196.3)] N84-17338

MEMBRANE STRUCTURES
The 2-dimensional inextensible lifting membrane airfoil, theory and experiment
[AD-A135251] N84-17147
Interaction of weak shock waves and discrete gas inhomogeneities N84-17517

MERCATOR PROJECTION
Path discrepancies between great circle and rhumb line
[NASA-TM-85522] N84-17168

MERCURY CADMIUM TELLURIDES
Assessment of the potential of Langmuir-Blodgett films for room temperature IR (infrared) detectors
[AD-A134616] N84-17561

MERCURY COMPOUNDS
Excited state kinetics of mercury halides and mixtures with N2 and Xe
[AD-A135432] N84-17310

MERIDIONAL FLOW
Programs for calculating quasi-three-dimensional flow in a turbomachine blade row
[NASA-TM-83588] N84-17138

MESH
Intrinsic adaptive mesh techniques
[NASA-CR-175375] N84-17941

MESOSCALE PHENOMENA
Baroclinic inertial instability in the non-static equilibrium atmosphere
[BLL-TRANS-1568-(9022.552)] N84-17751
Frontogenesis in a moist atmosphere
[PB84-104066] N84-17779

MESSAGE PROCESSING
Preserving asymmetry by symmetric processes and distributed fair conflict resolution
[AD-A135458] N84-17986

MESSAGES
Synopsis and recommendations of the TSC Workshop on differential operation of NAVSTAR GPS, June 1983
[PB84-121599] N84-17170

METABOLISM
Energy balance and the composition of weight loss during prolonged space flight
[NASA-CR-171745] N84-17820
Behavioral change of blood lactate metabolism
[PB84-100171] N84-17850

METAL BONDING
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358

METAL COATINGS
Adhesion studies on ion plated TiN steel
[BLL-RISLEY-TR-4880-(9091.9F)] N84-17341

METAL FATIGUE
Preliminary study of thermomechanical fatigue of polycrystalline MAR-M 200
[NASA-TP-2280] N84-17350

METAL FILMS
Eddy current thickness gauge for reel-to-reel tape processes
[DE84-004050] N84-17567

METAL GRINDING
Wheel efficiency in the diamond-spark erosion grinding of tungsten carbides
[CSIR-TRANS-1693] N84-17418
Dressing methods for grinding wheels made of superhard abrasive materials
[CSIR-TRANS-1700] N84-17419

METAL MATRIX COMPOSITES
A technique for the nondestructive detection of voids and composition anomalies in metal matrix composite wires using X or gamma rays
[AD-A135481] N84-17359

METAL PLATES
An experimental and numerical investigation of pressure-shear waves in 6061-T6 aluminum and alpha-titanium N84-17345

METAL POWDER
Influence of vibration grinding on the properties of tungsten powders and the quality of sintered pieces
[BLL-M-35373] N84-17414

METAL STRIPS
The change of the mechanical properties of steel strip in processing lines
[BMFT-FB-T-83-178] N84-17383

METAL SURFACES
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358
A new technique for measuring metal surface properties at the Rayleigh critical angle
[DE84-001770] N84-17632

METAL WORKING
International Conference on Recent Developments in Specialty Steels and Hard Materials N84-17348
Dressing methods for grinding wheels made of superhard abrasive materials
[CSIR-TRANS-1700] N84-17419

METALLIC GLASSES
Metallic glass as a temperature sensor during ion plating
[NASA-TM-83566] N84-17351

METALS
The effect of gas bubbles and cavity dimensions on the local electrode potential within pits, crevices and cracks
[AD-A134729] N84-17364
Analysis of electrical accident prevention countermeasures
[PB84-102987] N84-17869

METAMORPHISM (GEOLOGY)
The classifications of metamorphic rocks and their applications to air photo interpretation procedures
[AD-A134965] N84-17675

METEOROLOGICAL INSTRUMENTS
Guide to meteorological instruments and methods of observation
[WMO-8] N84-17764

METEOROLOGICAL PARAMETERS
Typical remote sensing data products N84-17656
Reports of the U.S. - U.S.S.R. Weddell Polynya expedition, October-November 1981. Volume 6: Upper-air data
[AD-A134871] N84-17736
Estimation of parameters of spray clouds
[BLL-TRANS-1571-(9022.552)] N84-17752
Guide to meteorological instruments and methods of observation
[WMO-8] N84-17764
Pertinent meteorological data for hurricane Allen of 1980
[PB84-104322] N84-17766
Preparing meteorological data for use in routine dispersion calculations: Workgroup summary
[PB84-119890] N84-17774
Meteorological applications library (CRH.LB)
[PB84-122639] N84-17776

METEOROLOGICAL RADAR
Data acquisition for evaluation of an airborne lightning detection system
[AD-A135318] N84-17153

METEOROLOGICAL RESEARCH AIRCRAFT
Data acquisition for evaluation of an airborne lightning detection system
[AD-A135318] N84-17153

METEOROLOGICAL SATELLITES
Transfer of civil meteorological satellites
[H-REPT-98-509] N84-17238

Navy tactical applications guide. Operational environmental satellites. Polar-orbiting satellites geostationary satellites, spacecraft, sensors, imagery
[AD-A135466] N84-17240
NOAA (National Oceanic and Atmospheric Administration) satellite programs briefing
[PB84-108349] N84-17781

METHANE
Mechanisms and reaction dynamics related to methane combustion
[PB84-100932] N84-17333

METHOD OF MOMENTS
The discrete convolution method for solving some large moment matrix equations
[AD-A135420] N84-18007

MICROCOMPUTERS
Use of digitized radar and microcomputers to forecast local floods and irrigation needs
[PB84-105568] N84-17767
A reliability and failure mode analysis of celestial training device microcomputers employed by SAC and MAC
[AD-A135003] N84-17885
PASCAL/48 reference manual
[NASA-TM-85752] N84-17900

MICROFILMS
Microfiche Image Transmission System (MITS) demonstration field evaluation of microfacsimile
[AD-A134716] N84-17450

MICROPROCESSORS
An airborne programmable digital to video converter
[AD-A134839] N84-17181
Study of a pulse width modulated, telemetered, microprocessor based data acquisition system N84-17247
ATE, ATLAS and the microprocessor --- automatic test equipment (ATE); abreviated test language for all systems (ATLAS) N84-17872
HQ AFSC selection of a microprocessor development system
[AD-A134930] N84-17891
PASCAL/48 reference manual
[NASA-TM-85752] N84-17900
Luneburg lens and optical matrix algebra research
[NASA-TM-172276] N84-18047

MICROSTRIP TRANSMISSION LINES
Cylindrical microstrip array: C-band beacon antenna array with 48 rectangular radiating elements fed in-phase
[AD-A135144] N84-17442

MICROSTRUCTURE
Disclinations in carbon-carbon composites
[AD-A135248] N84-17295
International Conference on Recent Developments in Specialty Steels and Hard Materials N84-17348
Influence of composition on the microstructure and mechanical properties of a nickel-base superalloy single crystal
[NASA-TM-83563] N84-17354
Improved swelling resistance for PCA austenitic stainless steel under HFIR irradiation through microstructural control
[DE84-003203] N84-17370
Effects of pulsed and/or dual ion irradiation on microstructural evolution in a Ti and Si modified Austenitic alloy
[DE84-003411] N84-17374
Tie molecules in polyethylene
[PB84-101435] N84-17405
Muon spin rotation in solids
[NASA-CR-172789] N84-18067

MICROWAVE ANTENNAS
Adaptive microwave reflector N84-17235
Microwave reflector characterization using simple instruments in EVA N84-17236
Studies in fin-line antenna design for phased array applications
[AD-A135255] N84-17444

MICROWAVE ATTENUATION
Climatological coefficients for rain attenuation at millimeter wavelengths
[PB84-104272] N84-17475

MICROWAVE EQUIPMENT
Heterojunction solid-state devices for millimeter-wave sources
[AD-A135389] N84-17490
Automated acceptance test procedures for wideband microwave synthesized signal generator testing
[AD-A134923] N84-17563

MICROWAVE FILTERS
An active filter primer
[AD-A134838] N84-17498

MICROWAVE OSCILLATORS
Optimum design of millimeter-wave impatt diode oscillators
[AD-A135335] N84-17489

MICROWAVE PLASMA PROBES
Interaction of electromagnetic fields with plasma
[AD-A135173] N84-18054

MICROWAVE RADIOMETERS
Technology needs of advanced Earth observation spacecraft
[NASA-CR-3698] N84-17248
Remote sensing experiments on Spacelab and STS N84-17655
Dual channel water vapor radiometer system
[PB84-110445] N84-17746

MICROWAVE SCATTERING
A study of the dependence of radar backscatter cross section on wind speed and wave slope from the MARSEN experimental results (a contribution to studies of radar backscattering from the sea surface). Supplement to final report
[AD-A135041] N84-17441

MICROWAVE SENSORS
Investigation of design considerations for a complex demodulation filter
[NASA-CR-173295] N84-17195
Snow and ice monitoring by microwave techniques N84-17660

MICROWAVES
S-band SBAW microwave source, phase 2
[NASA-CR-175153] N84-17432
A study of microwave and millimeter-wave quasi-optical planar mixers
[AD-A135252] N84-17443
A program for computer-controlled impedance measurement within the microwave range --- antennas
[FOA-C-30330-E3] N84-17460
Microwave dielectric constant dependence on soil tension
[AD-A134651] N84-17673
Metallic microwave conductivity in shock-loaded rutile
[DE84-002174] N84-18075

MIDDLE ATMOSPHERE
Space research in Switzerland N84-17200

MIE SCATTERING
Journal of Research of the National Bureau of Standards. Volume 88, Number 5, September-October 1983
[PB84-125293] N84-17406

MILITARY HELICOPTERS
Crashworthy cyclic control stick
[AD-A135150] N84-17176
Lessons learned--advanced attack helicopter
[AD-A135521] N84-17177

MILITARY OPERATIONS
Implications of joint NASA/DOD participation in Space Shuttle operations
[PB84-122472] N84-17286
Extending human effectiveness during sustained operations through sleep management
[AD-A134782] N84-17825
A strategy for improving overhead cost control
[AD-A134661] N84-18092

MILITARY TECHNOLOGY
Military Medical Journal, no. 2, 1983
[L-2341] N84-17814
Military Medical Journal, no. 4, 1983
[L-2403] N84-17836

MILKY WAY GALAXY
Belt of life in the galaxy
[PR-76] N84-18127

MILLIMETER WAVES
A study of microwave and millimeter-wave quasi-optical planar mixers
[AD-A135252] N84-17443
Atmospheric scintillation at 94 GHz
[AD-A134743] N84-17452
Attenuation of millimeter waves on Earth-space paths by rain clouds
[PB84-115120] N84-17471
A diagnostic probe to investigate propagation at millimeter wavelengths
[PB84-104223] N84-17473
Climatological coefficients for rain attenuation at millimeter wavelengths
[PB84-104272] N84-17475
Optimum design of millimeter-wave impatt diode oscillators
[AD-A135335] N84-17489
Heterojunction solid-state devices for millimeter-wave sources
[AD-A135389] N84-17490
S-I-S mm-wave mixers and detectors
[AD-A134762] N84-18074

MINES
Electrical-shock prevention. Volume 2: Ground-fault interrupting devices
[PB84-102953] N84-17866

MINES (EXCAVATIONS)
Geological and geochemical controls on the chemical evolution of subsurface water in undisturbed and surface-mined landscapes in western North Dakota
[PB84-126952] N84-17685
Electrical-shock prevention. Volume 1: Protection of maintenance personnel
[PB84-102946] N84-17865
Electrical-shock prevention. Volume 4: Overhead-line contact fatalities
[PB84-102979] N84-17868

MINES (ORDNANCE)
IRAAM wind tunnel test, task 3
[AD-A135256] N84-17148

MINICOMPUTERS
Thermodynamics library for AFOS (Automation of Field Operations and Services) programmers (THERMO LB)
[PB84-122621] N84-17925

MINING
Electrical-shock prevention. Volume 1: Protection of maintenance personnel
[PB84-102946] N84-17865
Electrical-shock prevention. Volume 2: Ground-fault interrupting devices
[PB84-102953] N84-17866
Electrical-shock prevention. Volume 4: Overhead-line contact fatalities
[PB84-102979] N84-17868
Analysis of electrical accident prevention countermeasures
[PB84-102987] N84-17869

MIRROR FUSION
Circular waveguide systems for electron-cyclotron-resonant heating of the tandem mirror experiment-upgrade
[DE84-003739] N84-18062

MIRRORS
Polymeric glazings
[DE84-000016] N84-17402

MISSILE CONFIGURATIONS
Aerodynamic characteristics of a Sparrow 3 missile model in the flow field of a generalized parent body at Mach 2.86
[NASA-TM-85713] N84-17134
Studies and vorticity effects by the Euler equations with emphasis on supersonic flow fields
[AD-A135118] N84-17535

MISSILE RANGES
Soil characterization and evaluation at White Sands Missile Range, New Mexico
[AD-A134820] N84-17206

MISSILE TRACKING
The oceangoing space survey ship, the Wang Yuan
[AD-A135514] N84-17204

MISSILE TRAJECTORIES
Re-entry and simulation
[AD-A135515] N84-17201

MISSION PLANNING
Implications of joint NASA/DOD participation in Space Shuttle operations
[PB84-122472] N84-17286

MIXING
Northeast Scotland coastal field guide and geographical essays
[AD-A134861] N84-17674
The retrieval of atmospheric constituent mixing-ratio profiles from solar absorption spectra
[NASA-CR-173303] N84-17730
S-I-S mm-wave mixers and detectors
[AD-A134762] N84-18074

MIXING CIRCUITS
A study of microwave and millimeter-wave quasi-optical planar mixers
[AD-A135252] N84-17443

MIXING LENGTH FLOW THEORY
Hot-flow tests of a series of 10-percent-scale turbofan forced mixing nozzles
[NASA-TP-2268] N84-17525

MIXTURES
Thermophysical properties of gaseous carbon dioxide/water mixtures
[PB84-125228] N84-17330
Conformal solution methods based on the hard convex body expansion theory, section 1
[PB84-100940] N84-17332

MOBILE COMMUNICATION SYSTEMS
Implementing new technology in the land mobile radio services
[PB84-101591] N84-17472

MOBILITY
Amplitude Compandored Sideband compared to conventional frequency modulation for VHF mobile radio: Laboratory and field testing results
[PB84-116383] N84-17474

MODAL RESPONSE
IMAGES: A digital computer program for interactive modal analysis and gain estimation for eigensystem synthesis
[NASA-TM-85690] N84-17186
MODE TRANSFORMERS
Transmission line transformers; theory and design data
[FOA-C-30327-E] N84-17503
MODELS
Microwave dielectric constant dependence on soil tension
[AD-A134651] N84-17673
Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738
MODULATION
Interplanetary flow systems associated with cosmic ray modulation in 1977 - 1980
[NASA-TM-85120] N84-18149
Rapporteur paper for sessions MG1, MG3 and MG4: Modulation theory, interplanetary propagation and interplanetary accelerations
[NASA-TM-86047] N84-18150
MOISTURE
Meteorological applications library (CRH.LB)
[PB84-122639] N84-17776
MOISTURE CONTENT
Transport of water in frozen soil. I: Experimental determination of soil-water diffusivity under isothermal conditions
[AD-A135419] N84-17671
MOLECULAR BIOLOGY
Comparison of organisms and cell types using two-dimensional electrophoresis
[DE84-003574] N84-17807
MOLECULAR CLOUDS
Turbulence and mass motion in galactic molecular clouds N84-18129
MOLECULAR COLLISIONS
De-excitation and equipartition in H2-surface collisions
[DE84-003008] N84-18031
MOLECULAR STRUCTURE
Model compound studies of rigid rod aromatic heterocyclic polymer systems, the X-ray crystal structure of 2,6-diphenylbenzo (1,2-d; 5,4-d') diimidazole tetrahydrate, C20H14N4. 4H2O, a model system for the study of polymer-water interaction in polybenzimidazoles
[AD-A135276] N84-17393
MOLECULES
Tie molecules in polyethylene
[PB84-101435] N84-17405
MOLTEN SALTS
Chemical and electrochemical properties in molten alkaline hydroxides
[BLL-RISLEY-TR-4854-(9091.9F)] N84-17298
Molten salt electrochemical systems
[AD-A135108] N84-17304
Aluminum-manganese plating from a molten salt bath
[AD-A135240] N84-17356
MOLYBDENUM
Development of modified 9 Cr-1 Mo steel for elevated-temperature service
[DE84-003161] N84-17372
MOLYBDENUM ALLOYS
Influence of vibration grinding on the properties of tungsten powders and the quality of sintered pieces
[BLL-M-35373] N84-17414
MOMENTUM TRANSFER
Mass and momentum turbulent transport experiments with confined swirling coaxial jets
[NASA-CR-168252] N84-17530
MONOCHROMATIC RADIATION
A model for ordinal filtering of digital images
[AD-A134705] N84-18052
Maximum entropy reconstruction of a volume anomaly from pulse scatter data
[DE84-002463] N84-18084
MONOPULSE RADAR
S-band range tracker and Surveillance Lab interface
[AD-A134730] N84-17451
MONSOONS
Possible tidal modulation of the Indian monsoon onset
[AD-A135441] N84-17760
MORPHOLOGY
Morphology and movements of polarization features on Venus
[NASA-CR-166464] N84-18137
MOSSBAUER EFFECT
Crystal fields and second order magnetic hyperfine interactions in TmFe2Si2
[DE84-003622] N84-18078
MOTION
Morphology and movements of polarization features on Venus
[NASA-CR-166464] N84-18137
MOTIVATION
Motivation and performance appraisal behavior
[AD-A134311] N84-17842
MOTOR VEHICLES
An analysis of carbon monoxide emissions as a function of ambient temperature and vehicle parameters
[PB84-103829] N84-17599
MOVING TARGET INDICATORS
A multiple leg TMA (Target Motion Analysis) procedure with programs for the Hewlett-Packard HP-41CV, the Hewlett-Packard HP-75C, the sharp pC-1500 (TRS-80 pC and the Radio Shack TRS-80 model 100 portable computers
[AD-A134870] N84-17912
MULTIPLE ACCESS
Performance evaluation and control of distributed computer communication networks
[AD-A135121] N84-17928
MULTIPLICATION
Fast arithmetic operations on numbers and polynomials N84-17992
MULTIPROCESSING (COMPUTERS)
VLSI research
[AD-A134628] N84-17491
MULTISPECTRAL BAND SCANNERS
Remote sensing experiments on Spacelab and STS N84-17655
MULTISPECTRAL LINEAR ARRAYS
SPOT (French satellite) --- satellite and program overviews N84-17652
MULTIVARIATE STATISTICAL ANALYSIS
Control strategies for complex systems for use in aerospace avionics
[AD-A135072] N84-17179
MUONS
Muon spin rotation in solids
[NASA-CR-172789] N84-18067

N

N ELECTRONS
A new technique for measuring metal surface properties at the Rayleigh critical angle
[DE84-001770] N84-17632
NASA PROGRAMS
The national space program from the fifties into the eighties
[AD-A134799] N84-17197
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
Research and technology report, 1983
[NASA-TM-85865] N84-18152
NASTRAN
Development of a thermal and structural model for a NASTRAN finite-element analysis of a hypersonic wing test structure
[NASA-CR-170413] N84-17620
NAVIER-STOKES EQUATION
The effect of the artificial far field boundary on a finite different approximation of the Navier-Stokes equations for a compressible fluid
[AD-A135152] N84-17536
NAVIGATION
Path discrepancies between great circle and rhumb line
[NASA-TM-85522] N84-17168
NAVIGATION AIDS
Satellite-directed navigational guidance for aircraft
[H-REPT-98-510] N84-17164
NAVIGATION SATELLITES
Investigations of Doppler position determination following the short arc and semi short arc techniques --- Navy navigation satellite systems N84-17645
NAVSTAR SATELLITES
Synopsis and recommendations of the TSC Workshop on differential operation of NAVSTAR GPS, June 1983
[PB84-121599] N84-17170
NAVY
Effect of the microclimate on the night sleep and physical fitness of seamen during a cruise in the low latitudes N84-17813
NEODYMIUM COMPOUNDS
Study of intermetallic compounds in ternary systems Al-Ba-Nd and Al-Ba-Yb
[BLL-M-35387-(5828.4)] N84-17343
NEON ISOTOPES
Neon transport in selected organic composites --- stopping power of Kapton and polyethylene
[NASA-TM-85693] N84-18044
NERVES
Studies of electrically stimulated rat limb and peripheral nerve regeneration
[AD-A134358] N84-17806
NETWORK ANALYSIS
A program for computer-controlled impedance measurement within the microwave range --- antennas
[FOA-C-30330-E3] N84-17460
A stochastic network formulation for performance assessment and life-cycle modeling in complex system design
[AD-A135337] N84-17960
Probabilistic planning and budgeting for R and D programs involving activities of high uncertainty
[DE84-002310] N84-18093
NETWORK CONTROL
Performance evaluation and control of distributed computer communication networks
[AD-A135121] N84-17928
NEUROLOGY
Rabbit neurobehavioral toxicity from aluminum
[PB84-103266] N84-17809
NEUTRON BEAMS
Correlation of yield stress changes in 316 stainless steel irradiated with high-energy and fission neutrons
[DE84-002115] N84-17368
NEUTRON SOURCES
Preliminary tests of a second harmonic RF system for the intense pulsed neutron source synchrotron
[DE84-003595] N84-18041
NEVADA
Principal facts for gravity stations in the Nevada portion of the Kingman 1 degree by 2 degree quadrangle
[PB84-103084] N84-17749
NEWTON SECOND LAW
Milgrom's revision of cosmic dynamics: Amending Newton's laws or Keplers?
[NASA-TM-86049] N84-18132
NICKEL
Synthesis and characterization of binuclear Schiff base complexes of nickel, copper, and manganese
[AD-A135493] N84-17360
Effect of specimen size and nickel content on the impact properties of 12 Cr-1 MoVW ferritic steel
[DE84-003270] N84-17377
NICKEL ALLOYS
Factors which influence directional coarsening of Gamma prime during creep in nickel-base superalloy single crystals
[NASA-TM-83595] N84-17353
Influence of cobalt, tantaum and tungsten on the high temperature mechanical properties of single crystal nickel-base superalloys
[NASA-TM-83479] N84-17355
On the effect of fine grain size on the M sub s temperature in Fe-27Ni-0.025C alloys
[AD-A134807] N84-17366
Study of ion bombardment-induced subsurface compositional modifications in Ni-Cu alloys at elevated temperatures by ion scattering spectroscopy
[DE84-003632] N84-17380
Muon spin rotation in solids
[NASA-CR-172789] N84-18067
NICKEL CADMIUM BATTERIES
Development of a modular battery
[BMFT-FB-W-83-021] N84-17504
NITRIDING
Nitriding with a pulsed glow discharge
[BLL-OA-TRANS-3168-(6169.3)] N84-17335
NITROGEN
Integrated aircraft fuel tank inerting and compartment fire suppression system. Volume 2: Evaluation of nitrogen-enriched air as a fire suppressant
[AD-A134883] N84-17157
NITROGEN COMPOUNDS
Intracavity laser excitation of NCO fluorescence in an atmospheric pressure flame
[AD-A134740] N84-17579
NITROGEN DIOXIDE
Measurements of hypergolic fuels' and oxidants' permeation through commercial protective materials: Part 1. Inhibited red fuming nitric acid and unsymmetrical dimethylhydrazine
[AD-A134714] N84-17411
NITROGEN OXIDES
Mechanisms and reaction dynamics related to methane combustion
[PB84-100932] N84-17333
Air pollution effects on terrestrial ecosystems
[PB84-126313] N84-17712
NITROGEN POLYMERS
Synthesis of phosphorus-nitrogen polymers using Si-N-P reagents
[AD-A135224] N84-17392

NOAA SATELLITES
Navy tactical applications guide. Operational environmental satellites. Polar-orbiting satellites geostationary satellites, spacecraft, sensors, imagery
[AD-A135486] N84-17240
NOISE MEASUREMENT
The effects of blade mounted vortex generators on the noise from a MOD-2 wind turbine generator
[NASA-CR-172292] N84-18017
NOISE PROPAGATION
La Recherche Aerospatiale bimonthly bulletin, number 1983-3, 214/May-June
[ESA-TT-822] N84-18014
Contributions to the theory of quantum 1/f noise N84-18082
NOISE REDUCTION
Adaptive feedforward linear wideband HF power bank
[AD-A134744] N84-17493
Reduction of propeller noise by a reflecting rubber layer — ship propellers
[FOA-C-20506-E4] N84-18025
NOISE SPECTRA
Electrode noise in beta aluminas
[AD-A134837] N84-17497
NONDESTRUCTIVE TESTS
A technique for the nondestructive detection of voids and composition anomalies in metal matrix composite wires using X or gamma rays
[AD-A135481] N84-17359
Quality assurance of heat-fused polyethylene plastic pipe joints, phase 2
[PB84-104942] N84-17608
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 1
[AD-A135387] N84-17626
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 2
[AD-A135388] N84-17627
Introduction to acoustic emission
[NASA-TM-77088] N84-18016
NONLINEAR EQUATIONS
Nonlinear partial differential equations and related problems of pade approximations
[AD-A135110] N84-17948
Nonlinear resonance
[AD-A135117] N84-17950
Smoothness of bounded solutions of nonlinear evolution equations
[AD-A135294] N84-17958
Numerical methods for singular perturbation problems
[AD-A134696] N84-17966
NONLINEAR FILTERS
Linear and nonlinear filtering and related inverse scattering problems
[AD-A135175] N84-17954
NONLINEARITY
Aeroelastic analysis using nonlinear aerodynamic methods
[AD-A135133] N84-17146
Nonlinear geometric, material and time dependent analysis of reinforced concrete shells with edge beams
[PB84-104454] N84-17639
Review of radio-frequency, nonlinear effects on the ionosphere
[DE84-003832] N84-17739
NONNEWTONIAN FLUIDS
Fundamentals of non-Newtonian liquid flow on surfaces
[AD-A135543] N84-17541
NONPARAMETRIC STATISTICS
Nonparametric selection procedures for a two-way layout problem
[AD-A135385] N84-17962
NONSYNCHRONIZATION
Dynamic behavior of nonuniform tire/wheel assemblies
[PB84-125541] N84-17598
NONUNIFORMITY
Dynamic behavior of nonuniform tire/wheel assemblies
[PB84-125541] N84-17596
NORTH AMERICA
Estimation of North America anthropogenic sulfur deposition as a function of source/receptor separation
[DE84-003638] N84-17701
NORTH SEA
Validation of SEASAT-1 altimetry using ground truth in the North Sea region
[SER-B-263-MITT-166] N84-17681
NORTHERN HEMISPHERE
Kinetic energy in the northern hemisphere during the FGGE (First GARP Global Experiment) year
[AD-A135382] N84-17759
NOSE TIPS
Assessment of real gas effects on the prediction of the aerodynamics of high velocity Army shells
[AD-A134739] N84-17150
NOZZLE DESIGN
Space Shuttle ice suppression system validation, volume 2
[NASA-CR-171741] N84-17245
Characteristics of a four nozzle, slotted mixing stack with slanted shroud, gas eductor system
[AD-A134794] N84-17547
NOZZLE GEOMETRY
Space Shuttle ice suppression system validation, volume 3
[NASA-CR-171742] N84-17246
NUCLEAR CHEMISTRY
Activities in nuclear and high energy physics N84-18043
NUCLEAR EXPLOSION EFFECT
Nuclear explosion effects on telecommunication, etc. (effect of EMP and of ionizing radiation on electronics and optical electronics
[FOA-C-30302-A3] N84-17458
NUCLEAR EXPLOSIONS
Large amplitude waves generated by an explosive mechanism
[MRL-R-905] N84-17524
NUCLEAR PHYSICS
Activities in nuclear and high energy physics N84-18043
NUCLEAR POWER PLANTS
State-of-the-art of solid-state motor controllers. Part 4: Failure-rate and failure-mode data
[DE84-001022] N84-17502
Estimation of small area populatons using remote sensing and other approaches
[DE84-003404] N84-17678
NUCLEAR RADIATION
Environmental Radiation Data Report 31, July - September 1982
[PB84-104801] N84-17709
Environmental Radiation Data Report 32, October December 1982
[PB84-104793] N84-17710
NUCLEAR STRUCTURE
New horizons in electromagnetic physics
[DE84-002600] N84-18039
NUCLEAR WARFARE
Nuclear explosion effects on telecommunication, etc. (effect of EMP and of ionizing radiation on electronics and optical electronics
[FOA-C-30302-A3] N84-17458
NUCLEATION
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358
Entropy production during fatigue as a criterion for failure. The critical entropy threshold: A mathematical model for fatigue
[AD-A134767] N84-17628
A study of nucleation and growth of thin films by means of computer simulation: General features
[NASA-TM-83559] N84-17982
NUCLEON POTENTIAL
Specific heat of He-3 in the Fermi-liquid region
[DE83-014858] N84-17566
NUMBER THEORY
Computational methods in number theory, part 1
[MATH-CENTRE-TRACTS-154-PT-1] N84-17990
Machine models, computational complexity and number theory N84-17991
Primality testing N84-17993
Factorization algorithms of exponential order N84-17994
Perfect numbers and aliquot sequences N84-17996
Computational methods in number theory, part 2
[MATH-CENTRE-TRACTS-155-PT-2] N84-17999
The computation of Galois groups N84-18000
Class numbers and units N84-18001
Quadratic fields and factorization N84-18002
Multi-dimensional continued fraction algorithms N84-18003
Diophantine equations N84-18004
Numerical computation of special zeros of partial sums of Riemann's zeta function N84-18005
The first 200,000,001 zeros of Riemann's zeta function N84-18006
NUMERICAL ANALYSIS
An experimental and numerical investigation of pressure-shear waves in 6061-T6 aluminum and alpha-titanium N84-17345
The time development of a blast wave with shock heated electrons
[NASA-CR-175364] N84-17529
Signal detection for same-shape families of non-homogeneous Poisson processes
[AD-A135032] N84-17942
Progress in numerical calculations of ion-atom collisions
[DE84-003405] N84-18033
NUMERICAL DATA BASES
Typical remote sensing data products N84-17858
NUMERICAL DIFFERENTIATION
Computational methods in number theory, part 2
[MATH-CENTRE-TRACTS-155-PT-2] N84-17999
Class numbers and units N84-18001
Multi-dimensional continued fraction algorithms N84-18003
The first 200,000,001 zeros of Riemann's zeta function N84-18006
NYQUIST FREQUENCIES
Nyquist frequency
[AD-A135023] N84-17440

O

OBLIQUE SHOCK WAVES
Two-dimensional supersonic expansion flows on walls with nonequilibrium condensation N84-17125
OBSERVATION
Guide to meteorological instruments and methods of observation
[WMO-8] N84-17764
OCEAN BOTTOM
Wave propagation study of the central Mediterranean Sea using ocean bottom seismometers
[AD-A135484] N84-17790
Statistical aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea
[AD-A134428] N84-17796
Acoustic data and uncertainty in geotechnical site characterization offshore
[PB84-100908] N84-17801
OCEAN COLOR SCANNER
Remote sensing experiments on Spacelab and STS N84-17655
OCEAN CURRENTS
Ocean research for understanding climatic variations: Priorities and goals for the 1980's
[PB84-105816] N84-17768
Nearshore current model workshop summary
[AD-A134702] N84-17791
A compilation of moored current meter data from the western North Pacific. Volume 31, 1980 - 1982
[AD-A134234] N84-17796
OCEAN DATA ACQUISITIONS SYSTEMS
The first European Remote Sensing Satellite (ERS-1): Overall description, potential applications and users N84-17654
The remote sensing of oil pollution at sea: An attempt at synthesis N84-17662
OCEAN SURFACE
Sea state monitoring and applications N84-17665
Estimation of parameters of spray clouds
[BLL-TRANS-1571-(9022.552)] N84-17752
A determination of the constants for a second-order closure turbulence model from geophysical data
[AD-A134826] N84-17795
OCEAN TEMPERATURE
A determination of the constants for a second-order closure turbulence model from geophysical data
[AD-A134826] N84-17795
OCEANOGRAPHIC PARAMETERS
MIZEX: A program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 2: A science plan for a summer marginal ice zone experiment in the Fram Strait/Greenland sea: 1984
[AD-A134872] N84-17737
Flight measurement and analysis of AAFE RADSCAT wind speed signature of the ocean
[NASA-TM-85646] N84-17784
A determination of the constants for a second-order closure turbulence model from geophysical data
[AD-A134826] N84-17795
A compilation of moored current meter data from the western North Pacific. Volume 31, 1980 - 1982
[AD-A134234] N84-17796
Physical oceanography report STD data from drifting ice station Fram 1
[AD-A134244] N84-17797
OCEANOGRAPHY
Investigation of ice dynamics in the marginal ice zone — Arctic Ocean
[AD-A134599] N84-17799
NODC (National Oceanographic Data Center) inventory of XBT data along transects in U.S. Atlantic and Gulf coastal waters from NMFS/MARD ship of opportunity program for 1981
[PB84-122662] N84-17802

OCEANS
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773
FGGE level 3-B daily global analyses. Part 2: (Mar. 1979 - May 1979)
[PB84-100270] N84-17780
Linear time-variant space-variant filters and the WKB approximation
[AD-A134886] N84-18021

OCTANE NUMBER
Report of the 68th National Conference on Weights and Measures 1983
[PB84-110998] N84-17425

OIL POLLUTION
The remote sensing of oil pollution at sea: An attempt at synthesis N84-17662

OIL SLICKS
Design of a remotely controlled hovercraft vehicle for spill reconnaissance
[PB84-124084] N84-17187
The remote sensing of oil pollution at sea: An attempt at synthesis N84-17662

OILS
Experimental study of bubble cavities attached to a rotating shaft in a reservoir
[NASA-TM-83586] N84-17533

ON-LINE SYSTEMS
An on-line equivalent system identification scheme for adaptive control
[NASA-TM-85737] N84-17185
Approach to real-time holography
[DE84-002779] N84-17565

OPACITY
Proposals for VIRA (Venus International Reference Atmosphere): Solar and thermal radiation
[PR-829] N84-18135

OPERATORS (MATHEMATICS)
Experience with a regular expression compiler
[AD-A135202] N84-17888
Applications of Non-Self-Adjoint operator theory to the Singularity Expansion Method (SEM) and to the Eigenmode Expansion Method (EEM) in acoustic and electromagnetic problems
[AD-A135177] N84-17955
Convergence of quadratic forms in p-stable random variables and theta sub p-radonifying operators
[AD-A135314] N84-17959
Formulae for configuration averages of products of 1-body and 2-body operators in many-fermion spaces
[DE84-002634] N84-17971
Regular operator approximation theory
[HMI-B-389] N84-18008

OPERATORS (PERSONNEL)
Terminal work in the process industry: Experience in a time perspective. Part 2: A few years after the installation — computer terminal operators
[FOA-C-56039-H2-PT-2] N84-17422

OPTICAL COMMUNICATION
Long wavelength InGaAsP/InP lasers and optoelectronic integration N84-17573
Advanced filter technology
[AD-A135446] N84-18050

OPTICAL FILTERS
Advanced filter technology
[AD-A135446] N84-18050

OPTICAL PROPERTIES
Photoemission spectroscopy and the optical properties of surface
[PB84-100445] N84-17331
Chinese journal of infrared research (Selected articles)
[AD-A135504] N84-18051

OPTICAL RADAR
Results of a slant range visibility field test in Munich-Reim
[DFVLR-MITT-83-09] N84-17169
Doppler lidar signal and turbulence study
[NASA-CR-170976] N84-17574
Pulsed heterodyne CO2 laser/scanner system. Volume 1: Assembly report
[AD-A135059] N84-17577
Pulsed heterodyne CO2 laser/scanner system. Volume 2: Operating instructions
[AD-A135060] N84-17578

OPTIMAL CONTROL
Dynamics and control of forward swept wing aircraft
[NASA-CR-175369] N84-17172
Optimal electric drive control to suppress jerking
[BLL-M-35391-(5828.4)] N84-17589
Asynchronous discrete control of continuous processes
[AD-A135257] N84-17930
Linear and nonlinear filtering and related inverse scattering problems
[AD-A135175] N84-17954

OPTIMIZATION
Simply instrumentable and optimal digitization of analog information sources
[AD-A135124] N84-17484
Shape optimal design and free boundary value problems N84-17516
Algorithms, modeling and estimation for linear systems
[AD-A135134] N84-17951
Proposed second harmonic acceleration system for the intense pulsed neutron source rapid cycling synchrotron
[DE84-003601] N84-18036
Quantification of interference and detectability properties of visual stimuli for optimal display design
[AD-A135438] N84-18049

ORBIT TRANSFER VEHICLES
Orbital propulsion module system configuration study. Volume 1: Executive summary
[S/DT/YA-25-030-VOL-1] N84-17282
Orbital propulsion module system configuration study, volume 2
[S/DT/YA-25-030-VOL-2] N84-17283

ORBITAL MECHANICS
Investigation of electrodynamic stabilization and control of long orbiting tethers
[NASA-CR-170972] N84-17251

ORGANIC PHOSPHORUS COMPOUNDS
Synthesis of phosphorus-nitrogen polymers using Si-N-P reagents
[AD-A135224] N84-17392

ORGANIZATIONS
The national space program from the fifties into the eighties
[AD-A134799] N84-17197

ORGANOMETALLIC POLYMERS
A new approach to polymer chemistry: Organometallic and bioactive phosphazenes
[AD-A135429] N84-17396

OSCILLATIONS
Algorithm for the detection and integration of highly oscillatory ordinary differential equations using a generalized unified modifiec divided difference representation
[DE84-003585] N84-17978
Stability of the low degree 5 minute solar oscillations
[DE84-003786] N84-18143

OSCILLATORS
Switched-capacitor sampled-data networks with communication applications N84-17429
The evolution of spontaneous and coherent radiation in the free electron laser oscillator
[AD-A134458] N84-17583

OVERVOLTAGE
Electrical-shock prevention. Volume 4: Overhead-line contact fatalities
[PB84-102979] N84-17868

OXIDES
Method and apparatus for the rapid determination of gases, oxygen in particular, and of the combined forms in which they are present in metals
[BLL-OA-TRANS-3127-(6196.3)] N84-17340

OXIDIZERS
Potassium perchlorate reaction with pyrotechnic fuels
[DE84-002840] N84-17413

OXYGEN
Chemical generation and deactivation of oxygen singlet delta
[AD-A135392] N84-17308
Static feed water electrolysis subsystem testing and component development
[NASA-CR-166539] N84-17856

OXYGEN MASKS
The objective evaluation of aircrew protective breathing equipment. 5: Mask/goggles combinations for female crewmembers
[AD-A134912] N84-17830

OXYGEN SUPPLY EQUIPMENT
Chemical generation and deactivation of oxygen singlet delta
[AD-A135392] N84-17308

OZONE
Ozone reactions in aqueous solutions: A bibliography
[PB84-109883] N84-17325
Air pollution effects on terrestrial ecosystems
[PB84-128313] N84-17712

P

PACIFIC OCEAN
A compilation of moored current meter data from the western North Pacific. Volume 31, 1980 - 1982
[AD-A134234] N84-17796

PACKET SWITCHING
Model and analysis of a communication interface with distributed processing for application in a communication network by packet switching
[INPE-2773-TDL/136] N84-17926

PACKETS (COMMUNICATION)
Performance evaluation and control of distributed computer communication networks
[AD-A135121] N84-17928

PADE APPROXIMATION
Nonlinear partial differential equations and related problems of pade approximations
[AD-A135110] N84-17948

PANEL FLUTTER
Investigation of articulated panel dynamics N84-17230

PANELS
Investigation of articulated panel dynamics N84-17230

PARABOLIC ANTENNAS
Large inflated-antenna system N84-17234
Focusing the parabolic antenna
[NASA-CR-173304] N84-17642

PARABOLIC DIFFERENTIAL EQUATIONS
A computer program for solving the parabolic equation using an implicit finite-difference solution method and incorporating exact interface conditions
[AD-A135325] N84-17903

PARABOLIC REFLECTORS
Study on large, ultralight long-life structures in space, phase 2C
[TM-EKR3] N84-17284

PARALLEL PROCESSING (COMPUTERS)
Analysis of an error detection scheme for parallel computations
[AD-A134819] N84-17496
Foundations of computer science 4. Distributed systems. Part 1: Algorithms and complexity
[MATH-CENTRE-TRACTS-158-PT-1] N84-17873
Parallel computation N84-17875
Modelling algorithm execution time on processor arrays
[NASA-CR-172289] N84-17899
Myopic heuristics for the weighted tardiness problem on identical parallel machines
[AD-A134934] N84-17934
Theory of image analysis and recognition
[AD-A135453] N84-18106

PARALLEL PROGRAMMING
The fairness problem and nondeterministic computing networks N84-17883

PARAMAGNETISM
Metallic microwave conductivity in shock-loaded rutile
[DE84-002174] N84-18075

PARAMETER IDENTIFICATION
Control and identification of time varying systems
[AD-A135223] N84-18091

PARSING ALGORITHMS
Search algorithms and their implementation
[AD-A135154] N84-17953

PARTIAL DIFFERENTIAL EQUATIONS
Nonlinear partial differential equations and related problems of pade approximations
[AD-A135110] N84-17948
Control theory of hyperbolic systems
[AD-A135146] N84-17952

PARTIAL PRESSURE
Advanced air revitalization system testing
[NASA-CR-166540] N84-17855

PARTICLE ACCELERATION
Rapporteur paper for sessions MG1, MG3 and MG4: Modulation theory, interplanetary propagation and interplanetary acceleration
[NASA-TM-86047] N84-18150

PARTICLE ACCELERATORS
Nonlinear resonance
[AD-A135117] N84-17950
Numerical simulations of the NRL collective particle accelerator
[AD-A135533] N84-18028

PARTICLE EMISSION
Exhaust emissions from a diesel engine
[PB84-122910] N84-17713
Maximum likelihood reconstruction in emission tomography with time-of-flight information: A limited study
[AD-A135061] N84-17944

PARTICLE SIZE DISTRIBUTION
On the effect of fine grain size on the M sub s temperature in Fe-27Ni-0.025C alloys
[AD-A134807] N84-17366
Influence of vibration grinding on the properties of tungsten powders and the quality of sintered pieces
[BLL-M-35373] N84-17414

Microwave dielectric constant dependence on soil tension
[AD-A134651] N84-17673
PARTICLE TRAJECTORIES
Virtual cathode oscillations
[AD-A135120] N84-18027
PARTICLES
Look at techniques for the dimensional calibration of standard microscopic particles
[PB84-112648] N84-17324
PARTICULATE SAMPLING
Inertial Upper Stage (IUS) Solid Rocket Motor (SRM) core flow sampling at high altitudes
[AD-A134997] N84-17288
PASCAL (PROGRAMMING LANGUAGE)
PASCAL/48 reference manual
[NASA-TM-85752] N84-17900
PASSENGER AIRCRAFT
Semiannual report to Congress on the effectiveness of the civil aviation security program
[AD-A134860] N84-17156
Developments in cabin safety and crashworthiness — passenger aircraft N84-17161
PASSENGERS
Effects on rail transport caused by air transport supply alternatives within the Federal Republic of Germany for the year 2000
[DFVLR-MITT-83-14] N84-17160
PATENT POLICY
Further delineation of the utilization of scientific literature by U.S. patents
[PB84-100734] N84-18095
PATENTS
Further delineation of the utilization of scientific literature by U.S. patents
[PB84-100734] N84-18095
Further delineation of the utilization of scientific literature by U.S. patents. Appendices A: Distribution of references contained in patents to various sources
[PB84-100742] N84-18096
PATHOGENESIS
The effect of smoking on the non-specific resistance of the organism of seamen at sea N84-17816
PATHOLOGY
The 1980 and 1981 accident experience of civil airmen with selected visual pathology
[AD-A134898] N84-17158
PATTERN METHOD (FORECASTING)
Two-level compromise designs for estimating main effects and detecting interactions
[DE84-002997] N84-18094
PATTERN RECOGNITION
Application of a feature selection technique to samples of high resolution synthetic aperture radar imagery
[AD-A135006] N84-17438
Evaluation of published criteria for identifying metamorphic rocks on air photos: Two case studies in the northeastern United States
[AD-A135451] N84-17672
Pattern recognition and image processing review N84-17897
PAYLOAD DELIVERY (STS)
IMCS reflight certification requirements and design specifications
[NASA-CR-170968] N84-17167
PAYLOAD TRANSFER
Orbital propulsion module system configuration study. Volume 1: Executive summary
[S/DT/YA-25-030-VOL-1] N84-17282
Orbital propulsion module system configuration study, volume 2
[S/DT/YA-25-030-VOL-2] N84-17283
PERCEPTION
A method of measurement of behavioral factors affecting information systems design and use: An application of multidimensional scaling in uncovering individual psychological structure N84-18099
PERFORMANCE PREDICTION
Estimating the performance of telecommunication systems using the ionospheric transmission channel. Ionospheric communications analysis and prediction program user's manual
[PB84-111210] N84-17468
PERFORMANCE TESTS
Evaluation of visibility sensors at the Eglin Air Force Base climatic chamber
[AD-A135375] N84-17758
A test strategy for high resolution image scanners
[AD-A134998] N84-18048
PERIPHERAL CIRCULATION
Autonomic influences on peripheral circulatory and thermal responses to cold
[AD-A134444] N84-17831
PERMEABILITY
Measurements of hypergolic fuels' and oxidants' permeation through commercial protective materials: Part 1. Inhibited red fuming nitric acid and unsymmetrical dimethylhydrazine
[AD-A134714] N84-17411
PERMITTIVITY
National Bureau of Standards Journal of Research, volume 88, no. 4, July - August 1983
[PB84-115849] N84-17571
PERSONALITY
Effects of load, cognitive complexity and type A on satisfaction
[AD-A134415] N84-17846
PERSONNEL
Microfiche Image Transmission System (MITS) demonstration field evaluation of microfacsimile
[AD-A134716] N84-17450
PERSONNEL MANAGEMENT
Motivation and performance appraisal behavior
[AD-A134311] N84-17842
PERTURBATION
Baroclinic inertial instability in the non-static equilibrium atmosphere
[BLL-TRANS-1568-(9022.552)] N84-17751
Numerical methods for singular perturbation problems
[AD-A134696] N84-17666
PERTURBATION THEORY
Learning from numerical calculations of ion-atom collisions
[DE84-003265] N84-18035
PETN
The MRL small scale gap test for the assessment of shock sensitivity of high explosives
[MRL-R-896] N84-17408
PETROGRAPHY
Shock wave properties of anorthosite and gabbro
[NASA-CR-173309] N84-17521
PH FACTOR
Atmospheric deposition to forests
[DE84-003384] N84-17700
PHASE DIAGRAMS
Constitution diagram of system vanadium - copper
[AD-A135516] N84-17361
High pressure cosmochemistry applied to major planetary interiors: Experimental studies — phase diagram for the ammonia water system
[NASA-CR-173278] N84-18138
PHASE MODULATION
Correlative phase modulation for fixed satellite services, volume 1 (phase 1)
[PTI-SB-2363-21-3505-VOL-1] N84-17465
Correlative phase modulation for fixed satellite service-s. Volume 2: Supplementary report
[PTI-SB-2363-21-3794-VOL-2] N84-17466
PHASE SHIFT KEYING
Carrier acquisition and tracking by a COSTAS-loop with automatic frequency control
[DFVLR-FB-83-24] N84-17202
Correlative phase modulation for fixed satellite services, volume 1 (phase 1)
[PTI-SB-2363-21-3505-VOL-1] N84-17465
Correlative phase modulation for fixed satellite service-s. Volume 2: Supplementary report
[PTI-SB-2363-21-3794-VOL-2] N84-17466
V-band integrated quadriphase modulator
[NASA-CR-175159] N84-17480
PHASE TRANSFORMATIONS
Conformal solution methods based on the hard convex body expansion theory, section 1
[PB84-100940] N84-17332
Heat treatment and residual austenite
[CSIR-TRANS-1704] N84-17349
Consolidation of Si3N4 without additives (by hot isostatic pressing)
[NASA-CR-173279] N84-17389
Basic and applied research in the field of electronics and communications
[AD-A135283] N84-17487
Research Laboratory of Electronics
[AD-A135319] N84-17488
Deterministic chaos in materials exhibiting phase transitions
[AD-A135172] N84-17537
PHASED ARRAYS
Studies in fin-line antenna design for phased array applications
[AD-A135255] N84-17444
PHONONS
Spectroscopy of thermal energy transport
[AD-A134670] N84-18073
PHOSPHAZENE
A new approach to polymer chemistry: Organometallic and bioactive phosphazenes
[AD-A135429] N84-17396
PHOSPHORS
Dependence of thermoluminescence output on temperature during irradiation for several thermoluminescence phosphors
[AD-A134940] N84-17313
PHOTOABSORPTION
Photoemission spectroscopy and the optical properties of surface
[PB84-100445] N84-17331
PHOTOACOUSTIC SPECTROSCOPY
A photoacoustic study of chemically active systems
[AD-A134663] N84-17311
PHOTOCATHODES
Streak cameras for soft X-ray and optical radiation
[DE84-002780] N84-17564
PHOTOCHEMICAL REACTIONS
Comparison of photon stimulated dissociation of gas phase, solid and chemisorbed water
[AD-A134986] N84-17314
Photochemical energy storage (photosensitized isomerization of norbornadiene to quadricyclene by copper (I) complexes)
[AD-A135363] N84-17687
Photochemical generation of the optoacoustic effect
[DE84-003712] N84-18023
PHOTODECOMPOSITION
Crossed molecular beam studies of the reactions of oxygen and fluorine atoms
[AD-A135415] N84-17309
PHOTODISSOCIATION
Crossed molecular beam studies of the reactions of oxygen and fluorine atoms
[AD-A135415] N84-17309
Comparison of photon stimulated dissociation of gas phase, solid and chemisorbed water
[AD-A134986] N84-17314
Photochemical generation of the optoacoustic effect
[DE84-003712] N84-18023
PHOTOELECTRIC CELLS
Development of a solar energy system
[DE83-014236] N84-17690
Development of a solar energy system: Executive summary
[DE83-014392] N84-17693
PHOTOELECTRIC EMISSION
Influence of wake and photoemission on electric field measurements with a double probe on GEOS-2 N84-17261
Photoemission spectroscopy and the optical properties of surface
[PB84-100445] N84-17331
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358
Angle-resolved photoemission extended fine structure
[DE84-002899] N84-18060
PHOTOELECTRON SPECTROSCOPY
Photoemission spectroscopy and the optical properties of surface
[PB84-100445] N84-17331
PHOTOGEOLOGY
Requirements for spaceborne remote sensing in geology N84-17657
Remote sensing for geology N84-17668
Evaluation of published criteria for identifying metamorphic rocks on air photos: Two case studies in the northeastern United States
[AD-A135451] N84-17672
PHOTOINTERPRETATION
Approaches to radar image interpretation N84-17669
The classifications of metamorphic rocks and their applications to air photo interpretation procedures
[AD-A134965] N84-17675
APPS-4 (Analytical Photogrammetric Processing System-4) remote sensing applications guide
[AD-A134977] N84-17676
PHOTON BEAMS
Photon-burst correlation techniques for atmospheric crosswind measurements
[AD-A134617] N84-17735
PHOTON-ELECTRON INTERACTION
Two photon excitation as a tool for atmospheric and kinetic research
[NASA-CR-175378] N84-18026
PHOTOSYNTHESIS
Chemical and biological processes in CO/sub 2-ocean models
[DE84-003304] N84-17702
In vitro chlorophyll photosynthetic reaction
[PB84-104892] N84-17810
PHOTOVOLTAIC CELLS
Advanced photovoltaic system simulator to demonstrate the performance of advanced photovoltaic cells and devices
[DE83-009405] N84-17688

PHOTOVOLTAIC EFFECT
Chinese journal of infrared research (Selected articles)
[AD-A135504] N84-18051
PHYSICAL CHEMISTRY
Basic and applied research in the field of electronics and communications
[AD-A135283] N84-17487
PHYSICAL EXERCISE
Prevention of flight fatigue by physical training N84-17812
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824
Physiological responses to prolonged upper body exercise
[AD-A134811] N84-17826
PHYSICAL FITNESS
Effect of the microclimate on the night sleep and physical fitness of seamen during a cruise in the low latitudes N84-17813
PHYSICAL WORK
Assessment of the functional state of the heart muscle in aircrew members by means by bicycle ergometry N84-17815
PHYSIOCHEMISTRY
Exhaust emissions from a diesel engine
[PB84-122910] N84-17713
PHYSIOLOGICAL EFFECTS
Biochemical indicators of thermal stress: Selected genetic and physiological parameters
[PB84-100122] N84-17808
Prevention of flight fatigue by physical training N84-17812
The effect of smoking on the non-specific resistance of the organism of seamen at sea N84-17816
Water immersion and its computer simulation as analogs of weightlessness
[NASA-CR-171746] N84-17821
Physiological responses to prolonged upper body exercise
[AD-A134811] N84-17826
Arctic personnel effects
[AD-A134892] N84-17829
PHYSIOLOGICAL RESPONSES
Changes in the T and B systems of immunity in seamen during a long cruise N84-17819
Autonomic influences on peripheral circulatory and thermal responses to cold
[AD-A134444] N84-17831
PHYSIOLOGICAL TESTS
Assessment of the functional state of the heart muscle in aircrew members by means by bicycle ergometry N84-17815
PHYSIOLOGY
Research Laboratory of Electronics
[AD-A135319] N84-17488
PIEZOELECTRICITY
Spectroscopy of thermal energy transport
[AD-A134670] N84-18073
PILOT PERFORMANCE
Objective measure of pilot workload
[NASA-CR-173296] N84-17858
A theoretical approach to measuring pilot workload
[NASA-CR-173297] N84-17859
PILOT TRAINING
Instructor station display for use in T-37 flight simulation training
[AD-A134854] N84-17191
Visual cues in the simulation of low-level flight
[AD-A135461] N84-17839
Analysis of the pilot conversion process for the Air Force T-46A jet trainer aircraft
[AD-A134404] N84-17845
PILOTS (PERSONNEL)
The 1960 and 1961 accident experience of civil airmen with selected visual pathology
[AD-A134898] N84-17158
PINCH EFFECT
Comparisons of hydrodynamic beam models with kinetic treatments
[DE84-003242] N84-18057
PIONEER VENUS SPACECRAFT
Impact ionization effects on Pioneer Venus Orbiter N84-17270
PIPE FLOW
Finite analytic numerical solutions of laminar and turbulent convective heat transfer for pipe flow past a cavity N84-17515
PIPES (TUBES)
Tie molecules in polyethylene
[PB84-101435] N84-17405
Quality assurance of heat-fused polyethylene plastic pipe joints, phase 2
[PB84-104942] N84-17608
Some topics in finite elasticity N84-17614
Acoustic imaging of vapor bubbles through optically non-transparent media
[DE84-003961] N84-18022
PITTING
The effect of gas bubbles and cavity dimensions on the local electrode potential within pits, crevices and cracks
[AD-A134729] N84-17364
PLANAR STRUCTURES
Multifrequency synthetic aperture radar antenna comparison study --- for remote sensing
[NASA-CR-171736] N84-17434
PLANE STRAIN
Correlation of fracture toughness with tensile properties for irradiated 20% cold-worked 316 stainless steel
[DE84-003954] N84-17379
Stress-state index and Nadai-Lode parameter
[BLL-M-35433-(5828.4)] N84-17612
Some topics in finite elasticity N84-17614
PLANE WAVES
Strong motion effects due to seismic waves in dipping layers
[PB84-127919] N84-17747
PLANETARY COMPOSITION
High pressure cosmochemistry applied to major planetary interiors: Experimental studies --- phase diagram for the ammonia water system
[NASA-CR-173278] N84-18138
PLANETARY CORES
High pressure cosmochemistry applied to major planetary interiors: Experimental studies --- phase diagram for the ammonia water system
[NASA-CR-173278] N84-18138
PLANETARY RADIATION
Determination of the planetary radiation budget from TIROS-N satellites
[PB84-100916] N84-17748
PLANETARY WAVES
Atmospheric planetary-wave response to external forcing
[NASA-CR-175165] N84-17726
PLANNING
Thermal and electric energy and desalination with a salt gradient solar pond
[DE84-900416] N84-17691
Probabilistic planning and budgeting for R and D programs involving activities of high uncertainty
[DE84-002310] N84-18093
PLASMA CONTROL
Research on modeling of FED/INTOR radio-frequency heating and studies of FED/INTOR impurity-control mechanisms
[DE83-016756] N84-18056
Comparisons of hydrodynamic beam models with kinetic treatments
[DE84-003242] N84-18057
PLASMA DIAGNOSTICS
Comparison of thermal plasma observations on SCATHA and GEOS N84-17262
A potential control method for thermal plasma measurements on the DE-1 spacecraft N84-17276
Precisely aligned internal magnetic probes for the reversed-field pinch experiment, ZT-40
[DE84-003704] N84-18058
PLASMA DRIFT
The DC electric field in space: Direct measurements and inferences from cold plasma drifts N84-17264
PLASMA EQUILIBRIUM
Observations of the GEOS-2 equilibrium potential and its relation to the ambient electron energy distribution N84-17256
PLASMA HEATING
Nitriding with a pulsed glow discharge
[BLL-OA-TRANS-3168-(6169.3)] N84-17335
The cathode material for a plasma-arc heater
[BLL-OA-TRANS-3126-(6196.3)] N84-18053
PLASMA INTERACTIONS
Photovoltaic concentrator pointing dynamics and plasma interaction study N84-17224
Spacecraft/plasma interactions and their influence on field and particle measurements --- conferences
[ESA-SP-198] N84-17253
Interaction of the space shuttle orbiter with the ionospheric plasma N84-17265
PLASMA JETS
The cathode material for a plasma-arc heater
[BLL-OA-TRANS-3126-(6196.3)] N84-18053
PLASMA OSCILLATIONS
Virtual cathode oscillations
[AD-A135120] N84-18027
PLASMA PHYSICS
ISEE observations of magnetopause reconnection: The energy balance N84-17720
PLASMA POTENTIALS
Effects of small-scale plasma disturbance on the IKB-1300 spacecraft potential
[PR-839] N84-17208
Spacecraft/plasma interactions and their influence on field and particle measurements --- conferences
[ESA-SP-198] N84-17253
The potential of ISEE in different plasma environments N84-17257
Anomalously high potentials observed on ISEE N84-17258
The role of potential barrier formation in spacecraft charging N84-17269
A potential control method for thermal plasma measurements on the DE-1 spacecraft N84-17276
Methods for keeping a conductive spacecraft near the plasma potential N84-17277
PLASMA SHEATHS
Contributions to satellite sheath and wake modeling N84-17266
A model of electrostatic charging and sheath structure of GIOTTO near Halley's comet N84-17274
PLASMA WAVES
Interplanetary flow systems associated with cosmic ray modulation in 1977 - 1980
[NASA-TM-85120] N84-18149
PLASMA-ELECTROMAGNETIC INTERACTION
Interaction of electromagnetic fields with plasma
[AD-A135173] N84-18054
PLASMAS (PHYSICS)
Effects of small-scale plasma disturbance on the IKB-1300 spacecraft potential
[PR-839] N84-17208
Nonlinear mode coupling theory of the lower-hybrid-drift instability
[AD-A135538] N84-17734
PLASTIC FLOW
Stress-state index and Nadai-Lode parameter
[BLL-M-35433-(5828.4)] N84-17612
PLASTIC PROPERTIES
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635
PLASTICIZERS
Mass spectrometric decomposition studies on several azido and nitrato polymers, thermal plasticizers and novel nitramines
[AD-A134636] N84-17398
PLASTICS
Plane stress crack-line fields for crack growth in an elastic perfectly-plastic material
[AD-A134868] N84-17630
PLATFORMS
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
Space Technology Experiments Platform (STEP) overview N84-17212
STEP mechanical systems N84-17213
STEP electronic system design N84-17214
STEP experiment integration N84-17215
PLATINUM
The electrochemical behaviour of titanium platinum alloys in anodic oxidation processes. 1: Kinetics and selectivity of the process of the combined formation of O2, H2S2O8 and O3 on the titanium-platinum alloy
[BLL-OA-TRANS-3093-(6196.3)] N84-17336
Structural and electrochemical properties of platinum-titanium laser surface alloys N84-17346
PLOTTERS
APPS-4 (Analytical Photogrammetric Processing System-4) remote sensing applications guide
[AD-A134977] N84-17676
PLUGS
Vapor-liquid phase separator studies
[NASA-CR-166545] N84-17527
PLUMES
Inertial Upper Stage (IUS) Solid Rocket Motor (SRM) core flow sampling at high altitudes
[AD-A134997] N84-17288
Turbulence measurements in plane jets and plumes in crossflow
[PB84-105303] N84-17554
A model for simulation of a fluctuating plume
[FOA-C-40165-A1(C1)] N84-17741
POINTING CONTROL SYSTEMS
Photovoltaic concentrator pointing dynamics and plasma interaction study N84-17224
POISSON DENSITY FUNCTIONS
Signal detection for same-shape families of non-homogeneous Poisson processes
[AD-A135032] N84-17942
Identification of a class of filtered Poisson processes
[AD-A134970] N84-17969

POLAR ORBITS
A statistical technique for forecasting severe weather from vertical soundings by satellite and radiosonde
[PB84-114099] N84-17772
POLARIMETRY
Morphology and movements of polarization features on Venus
[NASA-CR-166464] N84-18137
POLARIZATION
Polarizing holographic reflector for Electron Cyclotron Resonant Heating (ECRH) on the Tandem Mirror Experiment Upgrade (TMX-U)
[DE84-003740] N84-17568
POLARIZATION (CHARGE SEPARATION)
The effect of gas bubbles and cavity dimensions on the local electrode potential within pits, crevices and cracks
[AD-A134729] N84-17364
Optimum dimensions of solid zirconium dioxide-base electrolyte in transducer of activity meter N84-18064
POLARIZATION (WAVES)
Morphology and movements of polarization features on Venus
[NASA-CR-166464] N84-18137
The interpretation of hard X-ray polarization measurements in solar flares
[NASA-CR-172790] N84-18142
POLICIES
The national space program from the fifties into the eighties
[AD-A134799] N84-17197
POLLUTION CONTROL
Apparatus and method for destructive removal of particles contained in flowing fluid
[NASA-CASE-NPO-15426-1] N84-17555
Experimental investigation concerning the feasibility of electrostatic precipitators at high pressures and temperatures — gas cleaning systems for coal conversion
[BMFT-FB-T-83-201] N84-17704
POLLUTION MONITORING
Review of the National Ambient Air Quality Standards for sulfur oxides: Assessment of scientific and technical information
[PB84-102920] N84-17711
POLLUTION TRANSPORT
An analysis of carbon monoxide emissions as a function of ambient temperature and vehicle parameters
[PB84-103829] N84-17599
Evaluation of wind field interpolation schemes used in studies of regional-scale pollutant transport
[DE84-003634] N84-17699
Dispersion experiments with sulfur hexafluoride from the 213m high meteorological mast at Cabauw in the Netherlands N84-17706
Review of the National Ambient Air Quality Standards for sulfur oxides: Assessment of scientific and technical information
[PB84-102920] N84-17711
POLOIDAL FLUX
Precisely aligned internal magnetic probes for the reversed-field pinch experiment, ZT-40
[DE84-003704] N84-18058
POLYATOMIC MOLECULES
Crossed molecular beam studies of the reactions of oxygen and fluorine atoms
[AD-A135415] N84-17309
POLYBENZIMIDAZOLE
Model compound studies of rigid rod aromatic heterocyclic polymer systems, the X-ray crystal structure of 2,6-diphenylbenzo (1,2-d; 5,4-d') diimidazole tetrahydrate, C2OH14N4. 4H2O, a model system for the study of polymer-water interaction in polybenzimidazoles
[AD-A135278] N84-17393
POLYCARBONATES
Three-dimensional measurements of fatigue crack closure
[NASA-CR-175366] N84-17616
POLYCRYSTALS
A study on the tensile strength of ice as a function of grain size
[AD-A134889] N84-17631
POLYETHYLENES
Structure, inhibition and extinction of polymer diffusion flames
[PB84-101336] N84-17327
Tie molecules in polyethylene
[PB84-101435] N84-17405
Neon transport in selected organic composites — stopping power of Kapton and polyethylene
[NASA-TM-85693] N84-18044
POLYIMIDE RESINS
A study of polymer matrix fatigue properties
[AD-A135076] N84-17294
POLYMER CHEMISTRY
Structure, inhibition and extinction of polymer diffusion flames
[PB84-101336] N84-17327
A new approach to polymer chemistry: Organometallic and bioactive phosphazenes
[AD-A135429] N84-17396
POLYMERIZATION
Deposition of polymer films on metal by the electrolysis of aqueous solutions of vinyl monomers
[BLL-LTS-1200/83-(5826.4F)] N84-17386
Synthesis of phosphorus-nitrogen polymers using Si-N-P reagents
[AD-A135224] N84-17392
POLYMERS
Chloride ion conductivity in a plasticized quaternary ammonium polymer
[AD-A135373] N84-17305
Behavior of an aromatic heterocyclic polymer in salt solution
[AD-A134865] N84-17401
POLYMETHYL METHACRYLATE
Polymeric glazings
[DE84-000016] N84-17402
POLYNOMIALS
Derivations of a prime ring which satisfy a polynomial identity
[AD-A135435] N84-17963
Computational methods in number theory, part 1
[MATH-CENTRE-TRACTS-154-PT-1] N84-17990
Fast arithmetic operations on numbers and polynomials N84-17992
Factorization of polynomials N84-17998
POLYSTYRENE
Crack propagation in polystyrene under fixed elongation
[AD-A134749] N84-17399
POLYSULFIDES
Cyclic voltammetry of polysulfide (Thiokol) prepolymers and related compounds
[MRL-R-911] N84-17387
POLYURETHANE FOAM
Hydrolysis of plastic wastes with the aim of recovering and reprocessing the starting components (recycling)
[BMFT-FB-T-83-199] N84-17322
POPULATION THEORY
Isotonic procedures for selecting populations better than a standard: Two-parameter exponential distributions
[AD-A135445] N84-17985
POPULATIONS
Estimation of small area populatons using remote sensing and other approaches
[DE84-003404] N84-17678
PORTABLE EQUIPMENT
Analysis of technical possibilities for further sharing of the UHF television band by the land mobile services in the top ten land mobile markets
[PB84-123116] N84-17470
POSITION (LOCATION)
NODC (National Oceanographic Data Center) inventory of XBT data along transects in U.S. Atlantic and Gulf coastal waters from NMFS/MARD ship of opportunity program for 1981
[PB84-122662] N84-17802
POSITIONING
Reports on cartography and geodesy, series 1: Original reports, number 90
[ISSN-0469-4236] N84-17643
Investigations of Doppler position determination following the short arc and semi short arc techniques — Navy navigation satellite systems N84-17645
Calibration measurements of Doppler receivers — satellite Doppler positioning N84-17647
Results of the simultaneous Doppler measuring campaign HOTDOC from 29 September to 10 October 1979 N84-17648
POTASSIUM PERCHLORATES
Surface compatibility studies of potassium perchlorate reaction with pyrotechnic fuels
[DE84-002829] N84-17412
Potassium perchlorate reaction with pyrotechnic fuels
[DE84-002840] N84-17413
POTENTIAL FLOW
Trailing edge flow conditions as a factor in airfoil design
[NASA-CR-173294] N84-17140
Computation of potential flows with embedded vortex rings and applications to helicopter rotor wakes
[NASA-CR-166542] N84-17526
POWDER METALLURGY
Production of titanium powders by the electrolysis of chloride-fluoride melts with a soluble anode
[BLL-OA-TRANS-3136-(6196.3)] N84-17338
POWER AMPLIFIERS
Power-amplification of a heavy-ion beam in an induction linac
[DE84-002911] N84-18042
POWER CONDITIONING
Advanced photovoltaic system simulator to demonstrate the performance of advanced photovoltaic cells and devices
[DE83-009405] N84-17688
POWER SPECTRA
Power spectral signatures of interplanetary corotating and transient flows
[NASA-TM-86051] N84-18131
POWER SUPPLIES
Advanced photovoltaic system simulator to demonstrate the performance of advanced photovoltaic cells and devices
[DE83-009405] N84-17688
PRECIPITATION (CHEMISTRY)
Precipitation mechanisms in aluminum-lithium alloys
[AD-A134836] N84-17367
PRECIPITATION (METEOROLOGY)
Atmospheric deposition to forests
[DE84-003384] N84-17700
Cloud physics investigations by the University of Wyoming in HIPLEX 1977-1982
[PB84-106756] N84-17770
Probable maximum precipitation and snowmelt criteria for southeast Alaska
[PB84-104371] N84-17777
PREDICTION ANALYSIS TECHNIQUES
A study of prediction methods for the high angle-of-attack aerodynamics of straight wings and fighter aircraft
[NASA-CR-3764] N84-17131
Theoretical and experimental engine-inlet flow fields for fighter forebodies
[NASA-TP-2270] N84-17132
Ceramic life prediction methodology - hot spin disc life program
[AD-A134783] N84-17400
Studies and vorticity effects by the Euler equations with emphasis on supersonic flow fields
[AD-A135118] N84-17535
PREDICTIONS
Conformal solution methods based on the hard convex body expansion theory, section 1
[PB84-100940] N84-17332
Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707
Cognition and arousal as predictors of risk taking: Effects of load and cognitive style
[AD-A134324] N84-17843
PREPOLYMERS
Cyclic voltammetry of polysulfide (Thiokol) prepolymers and related compounds
[MRL-R-911] N84-17387
PRESSURE
Effects of JP-4 fuel on Graphite/Epoxy composites
[AD-A135416] N84-17296
PRESSURE DISTRIBUTION
Distribution of unit pressures in universal spindle joint N84-17588
Flow behavior in the Wright Brothers Facility
[WBWT-TR-1187] N84-18088
PRESSURE EFFECTS
The time development of a blast wave with shock heated electrons
[NASA-CR-175364] N84-17529
PRESSURE GRADIENTS
Trailing edge flow conditions as a factor in airfoil design
[NASA-CR-173294] N84-17140
PRESSURE MEASUREMENT
Hot-flow tests of a series of 10-percent-scale turbofan forced mixing nozzles
[NASA-TP-2268] N84-17525
Static feed water electrolysis subsystem testing and component development
[NASA-CR-166539] N84-17856
PRESSURE VESSELS
A nonintrusive nuclear monitor for measuring liquid contents in sealed vessels
[NASA-TM-85754] N84-17560
PRISMS
Improvements to high speed rotating prism cameras including on board timing and event pulse generators
[MRL-TN-476] N84-17557
PROBABILITY DENSITY FUNCTIONS
Mass and momentum turbulent transport experiments with confined swirling coaxial jets
[NASA-CR-168252] N84-17530
PROBABILITY THEORY
Program for the analysis of fault trees
[AD-A134746] N84-17910

Markov decision processes with continuous time parameter
[MATH-CENTRE-TRACTS-164] N84-17940
Noise
[AD-A135066] N84-17983

PROBLEM SOLVING
Problem solving abilities
[AD-A134717] N84-17840
Reasoning in multiple belief spaces N84-17894
Proceedings of the Conference on Joint Problem Solving and Microcomputers
[AD-A135001] N84-17901
A computer program for solving the parabolic equation using an implicit finite-difference solution method and incorporating exact interface conditions
[AD-A135325] N84-17903
Temporal finite elements based on a minimum principle for initial value problems N84-17935
Search algorithms and their implementation
[AD-A135154] N84-17953
International Conference on Stiff Computation
[AD-A135265] N84-17956
Numerical solution of singular integral equations arising in mixed boundary value problems of elasticity
[AD-A134673] N84-17965
Numerical methods for singular perturbation problems
[AD-A134696] N84-17966
Automatic adaptive grid refinement for the Euler equations
[NASA-CR-173161] N84-17977
Algorithm for the detection and integration of highly oscillatory ordinary differential equations using a generalized unified modified divided difference representation
[DE84-003585] N84-17978
The discrete convolution method for solving some large moment matrix equations
[AD-A135420] N84-18007
The effect of locus of control on performance with man-machine dialogues N84-18096
The program complexity of searching a table
[AD-A135299] N84-18104

PROCESS CONTROL (INDUSTRY)
EASAMS architecture for management and control systems N84-17871

PROCUREMENT MANAGEMENT
Quality management in procurement N84-17601

PRODUCT DEVELOPMENT
The mobile laser ranging system and its planned use in the framework of international research on geodynamics N84-17649
Support development program for the qualification of solar farm collectors
[BMFT-FB-T-83-207] N84-17696

PRODUCTION ENGINEERING
Identification of bottlenecks and capacity constraints in F-14, F-15, F-16, and F/A-18 aircraft production
[AD-A134629] N84-17121
Mini-Seminar on Quality Assurance
[CSIR-TSD-0008/82] N84-17600
Management input in quality N84-17602
Design QA on a small batch project N84-17603

PROGRAM VERIFICATION (COMPUTERS)
TERR, PERR, and GIGC: Three programs to compute verification statistics
[PB84-127521] N84-17775
Ten years of Hoare's logic, a survey. Part 2: Nondeterminism N84-17882
Verification of concurrent programs: A temporal proof system N84-17884
Sperry Univac, Univac 1100/80, UBASIC/BBASIC level 9R1
[PB84-113901] N84-17919
Sperry Univac, Univac 1100/80, ASCII FORTRAN level 10R1A
[PB84-113893] N84-17920
Four Phase Systems, Incorporated IV/90 Mod 2 COBOL '74 release BE07
[PB84-102706] N84-17923
Four Phase Systems, Incorporated IV/90 Mod 2 COBOL '74 release BE07.COBOL technical report
[PB84-102714] N84-17924

PROGRAMMING LANGUAGES
Processes and the denotational semantics of concurrency N84-17881
The fairness problem and nondeterministic computing networks N84-17883
Design and prototype implementation of SCAN: A programming language for scene analysis N84-17893
A demand-driven, coroutine-based implementation of a nonprocedural language N84-17895
RADC (Rome Air Development Center) DDP (Distributed Data Processing) topology evaluation
[AD-A134701] N84-17909
Computer networks without a shared memory
AFOSR-81-0197
[AD-A135074] N84-17927
Abstract automath
[MATH-CENTRE-TRACTS-160] N84-17938

PROJECT MANAGEMENT
Review of materials processing in space, 1983
[GPO-27-914] N84-17193
An Attached Payload Operations Center (APOC) at the Goddard Space Flight Center (GSFC), volume 2
[NASA-CR-175160-VOL-2] N84-17203
Design QA on a small batch project N84-17603

PROJECT PLANNING
Two-level compromise designs for estimating main effects and detecting interactions
[DE84-002997] N84-18094

PROJECTILES
Assessment of real gas effects on the prediction of the aerodynamics of high velocity Army shells
[AD-A134739] N84-17150

PROPELLANT TRANSFER
Measurements of hypergolic fuels' and oxidants' permeation through commercial protective materials: Part 1. Inhibited red fuming nitric acid and unsymmetrical dimethylhydrazine
[AD-A134714] N84-17411

PROPELLERS
Reduction of propeller noise by a reflecting rubber layer — ship propellers
[FOA-C-20506-E4] N84-18025

PROPULSION SYSTEM CONFIGURATIONS
Orbital propulsion module system configuration study. Volume 1: Executive summary
[S/DT/YA-25-030-VOL-1] N84-17282
Orbital propulsion module system configuration study, volume 2
[S/DT/YA-25-030-VOL-2] N84-17283

PROPULSION SYSTEM PERFORMANCE
TIGS (table plot interactive graphics system)--an interactive graphical system for the creation and correction of tabular data sets
[AD-A135522] N84-17906

PROTECTION
West breakwater-Sines (Portugal). Overview of rehabilitation and synthesis of project N84-17786

PROTECTIVE CLOTHING
Measurements of hypergolic fuels' and oxidants' permeation through commercial protective materials: Part 1. Inhibited red fuming nitric acid and unsymmetrical dimethylhydrazine
[AD-A134714] N84-17411

PROTECTIVE COATINGS
Ion deposited carbon coatings
[AD-A135068] N84-17390

PSYCHOLOGICAL FACTORS
Task conditions versus stable individual differences as determinants of experts' judgement policies
[AD-A134797] N84-17841

PUBLIC HEALTH
Suggested state regulations for control fo radiation. Volume 2: Nonionizing radiation, lasers
[PB84-109669] N84-17587

PULMONARY FUNCTIONS
Mathematical simulation of the cardiopulmonary system
[AD-A135460] N84-17822

PULSARS
A search for gravitational radiation from PSR 1937 + 214 N84-17717

PULSE DOPPLER RADAR
Sampling mismatch and timing jitter in pulse-Doppler radar
[AD-A134683] N84-17447

PULSE DURATION MODULATION
Study of a pulse width modulated, telemetered, microprocessor based data acquisition system N84-17247

PULSE HEATING
SP-100 program: Space reactor system and subsystem investigations
[DE84-003217] N84-18045

PULSE RADAR
Silent radar: A study of the performances of a navigational radar with limited range
[FOA-C-30334-E1] N84-17461

PULSED LASERS
Pulsed heterodyne CO2 laser/scanner system. Volume 1: Assembly report
[AD-A135059] N84-17577
Pulsed heterodyne CO2 laser/scanner system. Volume 2: Operating instructions
[AD-A135060] N84-17578

PULSED RADIATION
Temperature aspects of pulsed ion bombardment in an austenitic alloy
[DE84-003382] N84-17376
Proposed second harmonic accelaration system for the intense pulsed neutron source rapid cycling synchrotron
[DE84-003601] N84-18036

PULSES
Sensitivity and accuracy analysis of pulse diffusivity measurements on layered samples
[DE84-002104] N84-17584

PYROELECTRICITY
Chinese journal of infrared research (Selected articles)
[AD-A135504] N84-18051

PYROHELIOMETERS
Linear Fresnel lens photovoltaic concentrator program
[DE84-002971] N84-17689

PYROTECHNICS
Surface compatibility studies of potassium perchlorate reaction with pyrotechnic fuels
[DE84-002829] N84-17412
Potassium perchlorate reaction with pyrotechnic fuels
[DE84-002840] N84-17413

Q

QUADRATIC EQUATIONS
Quadratic fields and factorization N84-18002

QUALITATIVE ANALYSIS
Detection of elements in biomedical fluids by laser-induced breakdown spectroscopy
[DE84-003838] N84-17319

QUALITY CONTROL
Manual of analytical methods for radiobioassay
[DE84-003978] N84-17318
Mini-Seminar on Quality Assurance
[CSIR-TSD-0008/82] N84-17600
Quality management in procurement N84-17601
Management input in quality N84-17602
Design QA on a small batch project N84-17603
Measuring quality achievements N84-17605
Computer Science and Technology: Proceedings of the 19th Meeting of the Computer Performance Evauation Users Group (CPEUG)
[PB84-114529] N84-17892
Automotive Stirling engine development program
[NASA-CR-168205] N84-18117

QUANTITATIVE ANALYSIS
Cyclic voltammetry of polysulfide (Thiokol) prepolymers and related compounds
[MRL-R-911] N84-17387

QUANTUM CHROMODYNAMICS
Research in theoretical nuclear physics
[DE84-003442] N84-18038

QUANTUM ELECTRONICS
Research Laboratory of Electronics
[AD-A135319] N84-17488
RLE (Research Laboratory of Electronics)
[AD-A134812] N84-17495

QUANTUM MECHANICS
Formulae for configuration averages of products of 1-body and 2-body operators in many-fermion spaces
[DE84-002634] N84-17971
Contributions to the theory of quantum 1/f noise N84-18082

QUASARS
Luminosity calibration of low redshift quasars
[NASA-CR-175372] N84-18120
Observations of emission in bright, low redshift quasars
[NASA-CR-175376] N84-18122

QUATERNARY ALLOYS
Thermal conductivity of ternary and quaternary III-V compounds
[AD-A135336] N84-18070

QUENCHING (COOLING)
Tempering kinetics of alloy steels as a function of quench rate and M sub s temperature
[AD-A134806] N84-17365
Film synthesis and new superconductors
[AD-A135102] N84-18068

QUERY LANGUAGES
Improvement of the memory allocation algorithm for evaluating query language expressions in the relational database handler CANTOR
[FOA-C-20508-D8] N84-17916
Query processing and data allocation in distributed database systems
[MATH-CENTRE-TRACTS-156] N84-18101

QUEUEING THEORY
Systolic computation and VLSI N84-17877

R

RADAR
Research in aeronomy
[NASA-CR-175370] N84-17721

RADAR CORNER REFLECTORS
Luneburg lens and optical matrix algebra research
[NASA-TM-172276] N84-18047
RADAR CROSS SECTIONS
A study of the dependence of radar backscatter cross section on wind speed and wave slope from the MARSEN experimental results (a contribution to studies of radar backscattering from the sea surface). Supplement to final report
[AD-A135041] N84-17441
Flight measurement and analysis of AAFE RADSCAT wind speed signature of the ocean
[NASA-TM-85646] N84-17784
RADAR DETECTION
Silent radar: A study of the performances of a navigational radar with limited range
[FOA-C-30334-E1] N84-17461
RADAR IMAGERY
Application of a feature selection technique to samples of high resolution synthetic aperture radar imagery
[AD-A135006] N84-17438
Remote sensing experiments on Spacelab and STS N84-17655
Sea state monitoring and applications N84-17665
Approaches to radar image interpretation N84-17669
RADAR RANGE
S-band range tracker and Surveillance Lab interface
[AD-A134730] N84-17451
RADAR RECEIVERS
Atmospheric scintillation at 94 GHz
[AD-A134743] N84-17452
Calibration measurements of Doppler receivers --- satellite Doppler positioning N84-17647
RADAR TRACKING
S-band range tracker and Surveillance Lab interface
[AD-A134730] N84-17451
Atmospheric scintillation at 94 GHz
[AD-A134743] N84-17452
Pertinent meteorological data for hurricane Allen of 1980
[PB84-104322] N84-17766
RADAR TRANSMITTERS
Atmospheric scintillation at 94 GHz
[AD-A134743] N84-17452
RADIATION COUNTERS
Incident velocity distributions on sampling electrodes of spacecraft plasma instruments N84-17267
The cosmic ray energy spectrum from 2 x 10-17 to 10-e-19 EV N84-18146
RADIATION DAMAGE
Temperature aspects of pulsed ion bombardment in an austenitic alloy
[DE84-003382] N84-17376
RADIATION DETECTORS
Low energy neutrino physics
[DE84-002856] N84-18037
RADIATION DOSAGE
Environmental Radiation Data Report 33, January - March 1983
[PB84-104785] N84-17708
Neon transport in selected organic composites --- stopping power of Kapton and polyethylene
[NASA-TM-85693] N84-18044
RADIATION EFFECTS
Effects of high energy radiation on the mechanical properties of epoxy graphite fiber reinforced composites
[NASA-CR-173293] N84-17292
Comparison of the characteristics of graphites irradiated at 600 and 9000 deg C
[DE83-015695] N84-17297
Improved swelling resistance for PCA austenitic stainless steel under HFIR irradiation through microstructural control
[DE84-003203] N84-17370
Effects of space radiation on advanced semiconductor devices. Part 1: A review of current theories and practice in cosmic ray simulation
[G-2532-VOL-1] N84-17505
Effects of space radiation on advanced semiconductor devices. Part 2: Cosmic ray simulation experiments for the study of single event upsets in CMOS technology
[G-2745-VOL-2] N84-17506
Environmental Radiation Data Report 33, January - March 1983
[PB84-104785] N84-17708
Review of radio-frequency, nonlinear effects on the ionosphere
[DE84-003832] N84-17739
Biological Effects of Nonionizing Electromagnetic Radiation, volume 7, number 2-4, July - December 1982
[AD-A134674] N84-17805
RADIATION HARDENING
Advanced on-board signal procesor GaAs memory
[AD-A135465] N84-17890
RADIATION MEASUREMENT
Suggested state regulations for control fo radiation. Volume 2: Nonionizing radiation, lasers
[PB84-109669] N84-17587
Airborne fallout monitoring
[FOA-A-40045-A3] N84-17705
Environmental Radiation Data Report 31, July - September 1982
[PB84-104801] N84-17709
Environmental Radiation Data Report 32, October December 1982
[PB84-104793] N84-17710
RADIATION MEASURING INSTRUMENTS
A nonintrusive nuclear monitor for measuring liquid contents in sealed vessels
[NASA-TM-85754] N84-17560
RADIATION PRESSURE
Formation of dust lanes in spiral galaxies by radiation pressure N84-18130
RADIATION SHIELDING
Suggested state regulations for control fo radiation. Volume 2: Nonionizing radiation, lasers
[PB84-109669] N84-17587
RADIATIVE TRANSFER
Analysis of longwave radiation for the Earth-atmosphere system
[NASA-CR-173155] N84-17437
A laboratory investigation of the reflective properties of simulated, optically thick clouds
[NASA-CR-175362] N84-17755
RADICALS
Intracavity laser excitation of NCO fluorescence in an atmospheric pressure flame
[AD-A134740] N84-17579
RADIO ALTIMETERS
Validation of SEASAT-1 altimetry using ground truth in the North Sea region
[SER-B-263-MITT-166] N84-17681
A study of satellite radar altimeter operation over ice-covered surfaces
[ESA-CR(P)-1810] N84-17683
RADIO ASTRONOMY
Research Laboratory of Electronics
[AD-A135319] N84-17488
RADIO COMMUNICATION
Implementing new technology in the land mobile radio services
[PB84-101591] N84-17472
Amplitude Compandored Sideband compared to conventional frequency modulation for VHF mobile radio: Laboratory and field testing results
[PB84-116383] N84-17474
RADIO FREQUENCIES
Review of radio-frequency, nonlinear effects on the ionosphere
[DE84-003832] N84-17739
Biological Effects of Nonionizing Electromagnetic Radiation, volume 7, number 2-4, July - December 1982
[AD-A134674] N84-17805
Preliminary tests of a second harmonic RF system for the intense pulsed neutron source synchrotron
[DE84-003595] N84-18041
RADIO INTERFEROMETERS
The importance of radio interferometry for geodynamics N84-17644
RADIO SIGNALS
Research in aeronomy
[NASA-CR-175370] N84-17721
RADIO TRANSMISSION
The use of burst transmission to increase communication range: A feasibility study
[PB84-111400] N84-17467
RADIOACTIVITY
Airborne fallout monitoring
[FOA-A-40045-A3] N84-17705
Environmental Radiation Data Report 31, July - September 1982
[PB84-104801] N84-17709
Environmental Radiation Data Report 32, October December 1982
[PB84-104793] N84-17710
RADIOCHEMISTRY
Manual of analytical methods for radiobioassay
[DE84-003978] N84-17318
RADIOSONDES
Reports of the U.S. - U.S.S.R. Weddell Polynya expedition, October-November 1981. Volume 6: Upper-air data
[AD-A134871] N84-17736
RADON
Sea salt aerosol, atmospheric radon and meteorological observations in the western South Atlantic Ocean (February 1981)
[AD-A134792] N84-17794
RAIL TRANSPORTATION
Effects on rail transport caused by air transport supply alternatives within the Federal Republic of Germany for the year 2000
[DFVLR-MITT-83-14] N84-17160
RAILGUN ACCELERATORS
Experimental electromagnetic launchers at MRL
[MRL-R-894] N84-17482
Thermal-energy transport from arc to rails in an arc-driven rail gun
[AD-A134991] N84-17499
RAIN
Project DELUGE: The development of a Holloman high speed test track heavy rainfield
[AD-A134810] N84-17205
Project DELUGE: A proposed mathematical model for the Holloman AFB test track simulated rainfield
[AD-A134891] N84-17207
Climatological coefficients for rain attenuation at millimeter wavelengths
[PB84-104272] N84-17475
Pertinent meteorological data for hurricane Allen of 1980
[PB84-104322] N84-17766
Use of digitized radar and microcomputers to forecast local floods and irrigation needs
[PB84-105568] N84-17767
RAINMAKING
SCPP (Sierra Cooperative Pilot Project) forecasting support, volume 1
[PB84-107911] N84-17782
RAMAN SPECTRA
Evaluation of turbulence induced noise in coherent anti-Stokes Raman scattering
[NASA-CR-166544] N84-18015
Thresholds of Raman backscatter: Effects of collisions and Landau damping
[DE84-003736] N84-18060
RAMAN SPECTROSCOPY
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolved Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
RANDOM ACCESS MEMORY
Effects of space radiation on advanced semiconductor devices. Part 2: Cosmic ray simulation experiments for the study of single event upsets in CMOS technology
[G-2745-VOL-2] N84-17506
Advanced on-board signal procesor GaAs memory
[AD-A135465] N84-17890
RANDOM ERRORS
Effects of space radiation on advanced semiconductor devices. Part 2: Cosmic ray simulation experiments for the study of single event upsets in CMOS technology
[G-2745-VOL-2] N84-17506
RANDOM NOISE
Sampling mismatch and timing jitter in pulse-Doppler radar
[AD-A134683] N84-17447
Noise
[AD-A135066] N84-17983
RANDOM VARIABLES
Convergence of quadratic forms in p-stable random variables and theta sub p-radonifying operators
[AD-A135314] N84-17959
RANGE
Preliminary field tests for detecting flying targets in front of a land background --- ground observers
[FOA-C-56033-H2] N84-17847
RANGEFINDING
Earth strain measurements with the transportable laser ranging system: Field techniques and planning
[NASA-CR-175150] N84-17725
RATES (PER TIME)
Ozone reactions in aqueous solutions: A bibliography
[PB84-109883] N84-17325
Civilian residential fire fatality rates: Six high-rate states versus six low-rate states
[PB84-102615] N84-17427
Models of the hard X-ray spectrum of AM Herculis and implications for the accretion rate
[NASA-TM-86045] N84-18123
RATINGS
Motivation and performance appraisal behavior
[AD-A134311] N84-17842
RATS
The response of rats to cutaneous dosing with trichothecene mycotoxins
[MRL-R-902] N84-17803
RAY TRACING
Effects of systematic errors on the mixing ratios of trace gases obtained from occulation spectra
[NASA-CR-175371] N84-18046

Luneburg lens and optical matrix algebra research
[NASA-TM-172276] N84-18047

RAYLEIGH DISTRIBUTION
A new technique for measuring metal surface properties at the Rayleigh critical angle
[DE84-001770] N84-17632

RAYLEIGH WAVES
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738
Strong motion effects due to seismic waves in dipping layers
[PB84-127919] N84-17747
Introduction to acoustic emission
[NASA-TM-77088] N84-18016

REACTION KINETICS
Chemical and electrochemical properties in molten alkaline hydroxides
[BLL-RISLEY-TR-4654-(9091.9F)] N84-17298
Excited state kinetics of mercury halides and mixtures with N2 and Xe
[AD-A135432] N84-17310
Technique for the rapid generation of OH radicals behind shock waves and its application to the study of combustion kinetics
[DE84-003183] N84-17317
Ozone reactions in aqueous solutions: A bibliography
[PB84-109863] N84-17325
Applications of solvent extraction in hydrometallurgy
[BLL-OA-TRANS-3162-(6196.3)] N84-17334
The electrochemical behaviour of titanium platinum alloys in anodic oxidation processes. 1: Kinetics and selectivity of the process of the combined formation of O2, H2S2O8 and O3 on the titanium-platinum alloy
[BLL-OA-TRANS-3093-(6196.3)] N84-17336
Method and apparatus for the rapid determination of gases, oxygen in particular, and of the combined forms in which they are present in metals
[BLL-OA-TRANS-3127-(6196.3)] N84-17340
Correlation of yield stress changes in 316 stainless steel irradiated with high-energy and fission neutrons
[DE84-002115] N84-17368
Potassium perchlorate reaction with pyrotechnic fuels
[DE84-002840] N84-17413
Threshold kinetics of a solar-simulator-pumped iodine laser
[NASA-TP-2241] N84-17575

REACTOR DESIGN
Fusion reactors: Physics and technology
[DE83-017148] N84-18055
Research on modeling of FED/INTOR radio-frequency heating and studies of FED/INTOR impurity-control mechanisms
[DE83-016756] N84-18056

REACTOR MATERIALS
Improved swelling resistance for PCA austenitic stainless steel under HFIR irradiation through microstructural control
[DE84-003203] N84-17370
Modification of alloy surface composition by segregation processes as a means of impurity control in fusion devices
[DE84-003645] N84-17373
Effects of pulsed and/or dual ion irradiation on microstructural evolution in a Ti and Si modified Austenitic alloy
[DE84-003411] N84-17374
Temperature aspects of pulsed ion bombardment in an austenitic alloy
[DE84-003382] N84-17376
The Shock and Vibration Digest, volume 15, no. 9
[AD-A134750] N84-17609
Leakage flow-induced vibrations of reactor components N84-17611
A new technique for measuring metal surface properties at the Rayleigh critical angle
[DE84-001770] N84-17632

REACTOR SAFETY
Torsional ultrasonic technique for reactor vessel liquid level measurement
[DE84-003357] N84-18024
SP-100 program: Space reactor system and subsystem investigations
[DE84-003217] N84-18045

REACTOR TECHNOLOGY
Aging degradation of cast stainless steel: Status and program
[DE84-004018] N84-17361
Ultra-high-field superconducting magnets
[DE84-003913] N84-18012

REAL TIME OPERATION
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1
[AD-A135232] N84-17485
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2
[AD-A135233] N84-17486
Automatic real time ionogram scaler with true height analysis - artist
[AD-A135174] N84-17732
Use of digitized radar and microcomputers to forecast local floods and irrigation needs
[PB84-105568] N84-17767

REAL VARIABLES
The computation of Galois groups N84-18000

REATTACHED FLOW
Numerical study of a separating and reattaching flow by using Reynolds-stress tubulence closure
[NASA-CR-166547] N84-17133

RECOMBINATION REACTIONS
Photochemical generation of the optoacoustic effect
[DE84-003712] N84-18023

RECORDS
Multidomain, multirecord-type Datatrieve-11 databases
[DE84-001707] N84-18110

RECOVERY PARACHUTES
Development of the parachute recovery system for the LBRV-2 reentry vehicle
[DE84-003340] N84-17151

RECTANGULAR WINGS
A study of prediction methods for the high angle-of-attack aerodynamics of straight wings and fighter aircraft
[NASA-CR-3764] N84-17131

RECTIFIERS
Inexpensive solid-state trigger unit for thyratrons
[DE84-001424] N84-17501

RECYCLING
Chromium
[PB84-100882] N84-17385

REDUCTION (CHEMISTRY)
Method and apparatus for the rapid determination of gases, oxygen in particular, and of the combined forms in which they are present in metals
[BLL-OA-TRANS-3127-(6196.3)] N84-17340

REENTRY VEHICLES
SP-100 program: Space reactor system and subsystem investigations
[DE84-003217] N84-18045

REFERENCE ATMOSPHERES
Proposals for VIRA (Venus International Reference Atmosphere): Solar and thermal radiation
[PR-829] N84-18135

REFLECTANCE
A laboratory investigation of the reflective properties of simulated, optically thick clouds
[NASA-CR-175362] N84-17755

REFLECTED WAVES
Transmission line transformers; theory and design data
[FOA-C-30327-E] N84-17503

REFLECTING TELESCOPES
STEP flight experiments Large Deployable Reflector (LDR) telescope N84-17231

REFRACTIVITY
Journal of Research of the National Bureau of Standards. Volume 88, Number 5, September-October 1983
[PB84-125293] N84-17406
Linear time-variant space-variant filters and the WKB approximation
[AD-A134886] N84-18021
Two photon excitation as a tool for atmospheric and kinetic research
[NASA-CR-175378] N84-18026

REFRACTORY MATERIALS
Refractory materials for high-temperature thermoelectric energy conversion
[NASA-CR-173159] N84-17388
S-I-S mm-wave mixers and detectors
[AD-A134762] N84-18074

REFRACTORY METALS
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358
The cathode material for a plasma-arc heater
[BLL-OA-TRANS-3126-(6196.3)] N84-18053

REGENERATION (PHYSIOLOGY)
Studies of electrically stimulated rat limb and peripheral nerve regeneration
[AD-A134358] N84-17806

REGISTERS (COMPUTERS)
Automated synthesis of digital hardware modules: Simulation and verification of interconnections
[AD-A135298] N84-17889

REGRESSION ANALYSIS
Empirical analysis of meandering and flow characteristics in laboratory and natural channels
[DE84-003461] N84-17679

REGULATIONS
Implementing new technology in the land mobile radio services
[PB84-101591] N84-17472
Suggested state regulations for control fo radiation. Volume 2: Nonionizing radiation, lasers
[PB84-109869] N84-17587

REINFORCED SHELLS
Nonlinear geometric, material and time dependent analysis of reinforced concrete shells with edge beams
[PB84-104454] N84-17639

RELATIVISTIC EFFECTS
The physical nature of the continuum in active galaxies N84-18128

RELATIVISTIC ELECTRON BEAMS
Radially resolved simulation of a high-gain free electron laser amplifier
[DE84-003751] N84-17585
Beam front accelerators
[DE84-003709] N84-18032

RELIABILITY
Aircrew training devices: Utility and utilization of advanced instructional features. Phase I: Tactical Air Command
[AD-A135052] N84-17190
Measuring quality achievements N84-17605
A reliability and failure mode analysis of celestial training device microcomputers employed by SAC and MAC
[AD-A135003] N84-17885
Abstract automath
[MATH-CENTRE-TRACTS-160] N84-17938

RELIABILITY ENGINEERING
Management input in quality N84-17602

REMOTE CONTROL
Design of a remotely controlled hovercraft vehicle for spill reconnaissance
[PB84-124064] N84-17187

REMOTE SENSING
Technology needs of advanced Earth observation spacecraft
[NASA-CR-3698] N84-17248
Multifrequency synthetic aperture radar antenna comparison study — for remote sensing
[NASA-CR-171736] N84-17434
Remote sensing: New satellite systems and potential applications — conferences
[ESA-SP-205] N84-17650
Current trends and research challenges in land remote sensing N84-17651
Typical SPOT data and products: Potential applications N84-17653
Remote sensing experiments on Spacelab and STS N84-17655
Typical remote sensing data products N84-17656
Requirements for spaceborne remote sensing in geology N84-17657
APPS-4 (Analytical Photogrammetric Processing System-4) remote sensing applications guide
[AD-A134977] N84-17676
Estimation of small area populatons using remote sensing and other approaches
[DE84-003404] N84-17678
Report from the URSI Commission F Symposium on Wave Propagation and Remote Sensing
[FOA-C-30340-E2] N84-17682
Satellite measurements of atmospheric aerosols
[AD-A135241] N84-17757
NOAA (National Oceanic and Atmospheric Administration) satellite programs briefing
[PB84-108349] N84-17781
Pattern recognition and image processing review N84-17897

REMOTE SENSORS
Investigation of design considerations for a complex demodulation filter
[NASA-CR-173295] N84-17195
Navy tactical applications guide. Operational environmental satellites. Polar-orbiting satellites geostationary satellites, spacecraft, sensors, imagery
[AD-A135466] N84-17240
Workshop on active microwave sensor design N84-17667

RENAL FUNCTION
Water immersion and its computer simulation as analogs of weightlessness
[NASA-CR-171746] N84-17821

RESEARCH
Research and technology report, 1983
[NASA-TM-85865] N84-18152

RESEARCH AND DEVELOPMENT
A 1983 science and technology posture hearing with Director, Office of Science and Technology Policy
[GPO-21-095] N84-18085
Further delineation of the utilization of scientific literature by U.S. patents
[PB84-100734] N84-18095

Research and development joint ventures
[GPO-26-312] N84-18114
National Aeronautics and Space Administration Act, 1985 N84-18116

RESEARCH FACILITIES
The Prandtl Hergesell project of a National Research Establishment for Aeronautics
[DFVLR-MITT-83-10] N84-17123
Joint industry/university cooperation with federally supported research facilities
[GPO-24-902] N84-18115

RESEARCH MANAGEMENT
Basic and applied research in the field of electronics and communications
[AD-A135283] N84-17487
Providing comprehensive national policy dealing with national needs and objectives in the Arctic and national materials policy
[H-REPT-98-593] N84-17840
Standard research materials: Feces and urine N84-17854
ONR Far East Scientific Bulletin. Volume 8, no. 3, July - September 1983
[AD-A134272] N84-18109

RESIDENTIAL AREAS
Civilian residential fire fatality rates: Six high-rate states versus six low-rate states
[PB84-102615] N84-17427

RESONANCE
Nonlinear resonance
[AD-A135117] N84-17950

RESONANT FREQUENCIES
The 25 kW resonant dc/dc power converter
[NASA-CR-168273] N84-17481

RESPONSE TIME (COMPUTERS)
Modelling algorithm execution time on processor arrays
[NASA-CR-172289] N84-17899

RESPONSES
Temporal aspects of eye movement when viewing multiple targets
[AD-A134853] N84-17828

REVERSE FIELD PINCH
Precisely aligned internal magnetic probes for the reversed-field pinch experiment, ZT-40
[DE84-003704] N84-18058

REVISIONS
Evaluation of Chem-Crete high strength modified asphalt concentrate
[PB84-105089] N84-17636

REYNOLDS NUMBER
Hot wire in low Reynolds number flow N84-18087

RHEOLOGY
Fundamentals of non-Newtonian liquid flow on surfaces
[AD-A135543] N84-17541
The ball bearing as a rheological test device
[NASA-TM-83570] N84-17591

RHODIUM
New process for recycling of rhodium and iridium from old catalysts
[BMFT-FB-T-83-179] N84-17321

RIBBON PARACHUTES
Development of the parachute recovery system for the LBRV-2 reentry vehicle
[DE84-003340] N84-17151

RIBS (SUPPORTS)
Multi-transition stamping of components with thin body and tall stiffening ribs
[BLL-M-35384-(5828.4)] N84-17415

RIEMANN MANIFOLD
Numerical computation of special zeros of partial sums of Riemann's zeta function N84-18005
The first 200,000,001 zeros of Riemann's zeta function N84-18006

RIGID STRUCTURES
A pressurized cylindrical shell with a fixed end which contains an axial part-through or through crack
[NASA-CR-173291] N84-17618

RINGS (MATHEMATICS)
Derivations of a prime ring which satisfy a polynomial identity
[AD-A135435] N84-17963

RISK
Reducing risk in seaways --- around the British Isles N84-17163
Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707
Cognition and arousal as predictors of risk taking: Effects of load and cognitive style
[AD-A134324] N84-17843

ROADS
Evaluation of Chem-Crete high strength modified asphalt concentrate
[PB84-105089] N84-17636
Development of a computer program for road detection in satellite images
[FOA-C-30316-E1] N84-17917

ROBOTICS
Precision flexible machining cells within a manufacturing system
[AD-A134864] N84-17595
Robotic technology applied to Army mobility systems
[AD-A134728] N84-17933

ROBOTS
Kinematics and dynamics of multi-rigid-body open-chain systems: Application to robot manipulators N84-17851
An optical proximity sensor for measuring surface position and orientation for robot manipulation
[AD-A134899] N84-17861
Measurement of robot accuracy using the Latin Square Three-Dimensional Ball Plate
[DE84-004920] N84-17862

ROBUSTNESS (MATHEMATICS)
Detection of abrupt changes in dynamic systems
[NASA-CR-173217] N84-17988

ROCK MECHANICS
Shock wave properties of anorthosite and gabbro
[NASA-CR-173309] N84-17521

ROCKET ENGINES
Space Processing Applications Rocket (SPAR) project, SPAR 9
[NASA-TM-82549] N84-17239

ROCKET EXHAUST
Inertial Upper Stage (IUS) Solid Rocket Motor (SRM) core flow sampling at high altitudes
[AD-A134997] N84-17288
Investigation of free jets issued from small solid propellant rocket engines N84-17290

ROCKET NOSE CONES
Development of the parachute recovery system for the LBRV-2 reentry vehicle
[DE84-003340] N84-17151

ROCKET PROPELLED SLEDS
Project DELUGE: A proposed mathematical model for the Holloman AFB test track simulated rainfield
[AD-A134891] N84-17207

ROCKET-BORNE INSTRUMENTS
Stellar Ultraviolet Rocket Research Program --- faint object spectrograph
[NASA-CR-175361] N84-18119

ROCKS
Evaluation of published criteria for identifying metamorphic rocks on air photos: Two case studies in the northeastern United States
[AD-A135451] N84-17672
The classifications of metamorphic rocks and their applications to air photo interpretation procedures
[AD-A134965] N84-17675
Lithological characterization of crystalline basement rock provinces of the interior of the United States
[NASA-CR-175180] N84-17727

ROLL
The question of optimization of three-dimensional maneuver of orbital apparatus in the atmosphere
[AD-A134753] N84-17280

ROLL FORMING
The change of the mechanical properties of steel strip in processing lines
[BMFT-FB-T-83-178] N84-17383

ROLLING
Hydrodynamic lubrication of rigid nonconformal contacts in combined rolling and normal motion
[NASA-TM-83578] N84-17592

ROLLING CONTACT LOADS
Hydrodynamic lubrication of rigid nonconformal contacts in combined rolling and normal motion
[NASA-TM-83578] N84-17592

ROTARY STABILITY
Effects of different rub models on simulated rotor dynamics
[NASA-TP-2220] N84-17590

ROTARY WING AIRCRAFT
Rotary wing aircraft and technical publications of NASA, 1970 - 1982
[NASA-TM-85521] N84-18102

ROTARY WINGS
Calculation of the aerodynamic flow field in the vicinity of a Sea King helicopter
[ARL-AERO-REPT-158] N84-17128
Documentation of ice shapes on the main rotor of a UH-1H helicopter in hover
[NASA-CR-168332] N84-17139
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-175380] N84-17171
Computation of potential flows with embedded vortex rings and applications to helicopter rotor wakes
[NASA-CR-166542] N84-17526
Experimental blade vortex interaction noise characteristics of a utility helicopter at 1/4 scale
[NASA-TM-84653] N84-18018

ROTATING CYLINDERS
Inversion of ringdown data for a rotating liquid cylinder
[AD-A134742] N84-17546
Similar velocity profiles and integral quantities of a boundary layer on a rotating cylinder
[VKI-NT-148] N84-17553

ROTATING ELECTRICAL MACHINES
Electrical-shock prevention. Volume 3: Fault protection for motion-drive equipment
[PB84-102961] N84-17867

ROTATING FLUIDS
La Recherche Aerospatiale, bimonthly bulletin number 1983-2, 213/March-April
[ESA-TT-817] N84-18013

ROTATING MIRRORS
Improvements to high speed rotating prism cameras including on board timing and event pulse generators
[MRL-TN-476] N84-17557

ROTATING PLASMAS
Power spectral signatures of interplanetary corotating and transient flows
[NASA-TM-86051] N84-18131

ROTATING SHAFTS
Experimental study of bubble cavities attached to a rotating shaft in a reservoir
[NASA-TM-83586] N84-17533

ROTATION
Improved turbulence models based on large eddy simulation of homogeneous, incompressible turbulent flows
[NASA-CR-166541] N84-17528

ROTOR AERODYNAMICS
Investigation of flow phenomena in a transonic fan rotor using laser anemometry
[NASA-TM-83555] N84-17143
Effects of different rub models on simulated rotor dynamics
[NASA-TP-2220] N84-17590

ROTOR BLADES (TURBOMACHINERY)
Effects of different rub models on simulated rotor dynamics
[NASA-TP-2220] N84-17590

ROTORS
A mathematical model for the doubly-fed wound rotor generator, part 2
[NASA-TM-83581] N84-17479

RUBBER COATINGS
Reduction of propeller noise by a reflecting rubber layer --- ship propellers
[FOA-C-20508-E4] N84-18025

RUBIDIUM
Rubidium frequency standard study
[AD-A134713] N84-17492

RUPTURING
Mechanical and transport properties of rocks at high temperatures and pressures. Task 3. Mechanical properties of rocks at high temperatures and pressures
[DE84-003438] N84-17740

RUTILE
Metallic microwave conductivity in shock-loaded rutile
[DE84-002174] N84-18075
Fast diffusion of iron in single crystal rutile and iron doped rutile
[DE84-004021] N84-18079

S

S MATRIX THEORY
Applications of Non-Self-Adjoint operator theory to the Singularity Expansion Method (SEM) and to the Eigenmode Expansion Method (EEM) in acoustic and electromagnetic problems
[AD-A135177] N84-17955

S WAVES
An experimental and numerical investigation of pressure-shear waves in 6061-T6 aluminum and alpha-titanium N84-17345
Surface wave tomography
[NASA-CR-175373] N84-17728

SAFETY
Task conditions versus stable individual differences as determinants of experts' judgement policies
[AD-A134797] N84-17841
Electrical-shock prevention. Volume 2: Ground-fault interrupting devices
[PB84-102953] N84-17866
Electrical-shock prevention. Volume 4: Overhead-line contact fatalities
[PB84-102979] N84-17868

SAFETY MANAGEMENT
Reducing risk in seaways --- around the British Isles N84-17163

SALINITY
Physical oceanography report STD data from drifting ice station Fram 1
[AD-A134244] N84-17797
Hydrographic station data of five surveys of the beta-triangle in the eastern North Atlantic, 1978 - 1981
[PB84-100874] N84-17800
NODC (National Oceanographic Data Center) inventory of XBT data along transects in U.S. Atlantic and Gulf coastal waters from NMFS/MARD ship of opportunity program for 1981
[PB84-122662] N84-17802

SALT BATHS
Electrodeposition method
[BLL-OA-TRANS-3134-(6196.3)] N84-17337
Aluminum-manganese plating from a molten salt bath
[AD-A135240] N84-17356

SALTS
Thermal and electric energy and desalination with a salt gradient solar pond
[DE84-900416] N84-17691
Sea salt aerosol, atmospheric radon and meteorological observations in the western South Atlantic Ocean (February 1981)
[AD-A134792] N84-17794

SAMPLING
Environmental Radiation Data Report 33, January - March 1983
[PB84-104785] N84-17708
Environmental Radiation Data Report 31, July - September 1982
[PB84-104801] N84-17709

SANDS
Evaluation of Chem-Crete high strength modified asphalt concentrate
[PB84-105089] N84-17636

SATELLITE ANTENNAS
Probe measurement of DC electric fields --- SCATHA satellite charging N84-17255
Shot noise generated by gas impact during a cometary fly-by --- Vega Halley's comet flyby N84-17273

SATELLITE ATTITUDE CONTROL
Canadian Attitude Sensing Experimental Package (CASEP) N84-17223
GEOS 1 and 2 in flight evaluation of the reaction control system
[SEP-TS/S/194/JM/30301/81(1)] N84-17242

SATELLITE DESIGN
ROSAT-FI design review
[MPE-39] N84-17209
Traffic routing in a switched regenerative satellite. Volume 2, task 4: Review (executive summary)
[ESA-CR(P)-1792-VOL-2] N84-17464
The first European Remote Sensing Satellite (ERS-1): Overall description, potential applications and users N84-17654

SATELLITE GROUND SUPPORT
SPOT (French satellite) --- satellite and program overviews N84-17652

SATELLITE GROUND TRACKS
Results of permanent Doppler measurements at the satellite observation station Wettzell N84-17646

SATELLITE INSTRUMENTS
ROSAT-FI design review
[MPE-39] N84-17209
Canadian Attitude Sensing Experimental Package (CASEP) N84-17223
The first European Remote Sensing Satellite (ERS-1): Overall description, potential applications and users N84-17654
Validation of SEASAT-1 altimetry using ground truth in the North Sea region
[SER-B-283-MITT-166] N84-17681

SATELLITE NAVIGATION SYSTEMS
Satellite-directed navigational guidance for aircraft
[H-REPT-98-510] N84-17164

SATELLITE NETWORKS
Traffic routing in a switched regenerative satellite. Volume 1, task 3: Traffic assignment
[ESA-CR(P)-1792-VOL-1] N84-17463
Traffic routing in a switched regenerative satellite. Volume 2, task 4: Review (executive summary)
[ESA-CR(P)-1792-VOL-2] N84-17464

SATELLITE OBSERVATION
Development of a computer program for road detection in satellite images
[FOA-C-30316-E1] N84-17917

SATELLITE ORBITS
Results of the simultaneous Doppler measuring campaign HOTDOC from 29 September to 10 October 1979 N84-17648

SATELLITE PERTURBATION
Effects of small-scale plasma disturbance on the IKB-1300 spacecraft potential
[PR-839] N84-17208

SATELLITE SOUNDING
A statistical technique for forecasting severe weather from vertical soundings by satellite and radiosonde
[PB84-114099] N84-17772

SATELLITE TRACKING
The oceangoing space survey ship, the Wang Yuan
[AD-A135514] N84-17204
Study on optimal tracking strategy --- satellite tracking
[GMV-211/83] N84-17243

SATELLITE TRANSMISSION
Digital sound service for direct broadcasting satellites N84-17462

SATELLITE-BORNE INSTRUMENTS
Incident velocity distributions on sampling electrodes of spacecraft plasma instruments N84-17267
A study of satellite radar altimeter operation over ice-covered surfaces
[ESA-CR(P)-1810] N84-17683

SATELLITE-BORNE PHOTOGRAPHY
Test of the use of LANDSAT imagery to detect changes in the area of forest in the tropics
[DE84-004444] N84-17680

SAWS
The use of diamond core saws in the electronics industry
[CSIR-TRANS-1702] N84-17417

SCALARS
Accuracy of stable schemes for 2D scalar conservation laws
[DE84-004989] N84-17976
A study of waves on a curved space-time N84-18083

SCALERS
Automatic real time ionogram scaler with true height analysis - artist
[AD-A135174] N84-17732

SCALING LAWS
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1
[AD-A135232] N84-17485
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2
[AD-A135233] N84-17486
An algebraic approach to analysis and control of time-scales
[AD-A135115] N84-17949

SCANNERS
Pulsed heterodyne CO2 laser/scanner system. Volume 1: Assembly report
[AD-A135059] N84-17577
Pulsed heterodyne CO2 laser/scanner system. Volume 2: Operating instructions
[AD-A135060] N84-17578

SCANNING
A test strategy for high resolution image scanners
[AD-A134998] N84-18048

SCATHA SATELLITE
A review of SCATHA satellite results: Charging and discharging N84-17254
Probe measurement of DC electric fields --- SCATHA satellite charging N84-17255
Comparison of thermal plasma observations on SCATHA and GEOS N84-17262
NASCAP simulations of spacecraft charging of the SCATHA satellite --- NASA (spacecraft) charging analyzer program (NASCAP) N84-17268

SCATTERING CROSS SECTIONS
A nonintrusive nuclear monitor for measuring liquid contents in sealed vessels
[NASA-TM-85754] N84-17560
Preliminary investigation of an electrical network model for ultrasonic scattering
[NASA-CR-3770] N84-17606

SCATTEROMETERS
Workshop on active microwave sensor design N84-17667
Evaluation of visibility sensors at the Eglin Air Force Base climatic chamber
[AD-A135375] N84-17758
Scatterometer System Simulator (SSS), phase 1: Definition --- ERS-1 (ESA satellite)
[ESA-CR(P)-1788] N84-17765
Flight measurement and analysis of AAFE RADSCAT wind speed signature of the ocean
[NASA-TM-85646] N84-17784

SCENE ANALYSIS
Design and prototype implementation of SCAN: A programming language for scene analysis N84-17893

SCHEDULING
Preventive maintenance on space systems
[AD-A134955] N84-17198
Analysis of the pilot conversion process for the Air Force T-46A jet trainer aircraft
[AD-A134404] N84-17845
Myopic heuristics for the weighted tardiness problem on identical parallel machines
[AD-A134934] N84-17934

SCIENTISTS
Further delineation of the utilization of scientific literature by U.S. patents. Appendices A: Distribution of references contained in patents to various sources
[PB84-100742] N84-18096

SCOTLAND
Northeast Scotland coastal field guide and geographical essays
[AD-A134861] N84-17674

SEA ICE
Remote sensing of sea ice --- Nimbus 7 scanning multichannel microwave radiometer (SMMR) N84-17664
Reports of the U.S. - U.S.S.R. Weddell Polynya expedition, October-November 1981. Volume 6: Upper-air data
[AD-A134871] N84-17736
Physical oceanography report STD data from drifting ice station Fram 1
[AD-A134244] N84-17797
Statistical aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea
[AD-A134428] N84-17798
Investigation of ice dynamics in the marginal ice zone --- Arctic Ocean
[AD-A134599] N84-17799

SEA LEVEL
Northeast Scotland coastal field guide and geographical essays
[AD-A134861] N84-17674

SEA STATES
A study of the dependence of radar backscatter cross section on wind speed and wave slope from the MARSEN experimental results (a contribution to studies of radar backscattering from the sea surface). Supplement to final report
[AD-A135041] N84-17441
Applications for fisheries --- satellite remote sensing N84-17663
Sea state monitoring and applications N84-17665

SEA WATER
Some parameters characterising the icing of ships from spray
[BLL-MO-TRANS-1570-(9022.552)] N84-17753
NODC (National Oceanographic Data Center) inventory of XBT data along transects in U.S. Atlantic and Gulf coastal waters from NMFS/MARD ship of opportunity program for 1981
[PB84-122662] N84-17802

SEALING
Development of a modular battery
[BMFT-FB-W-83-021] N84-17504

SEARCHING
Search algorithms and their implementation
[AD-A135154] N84-17953

SEASAT SATELLITES
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773

SEATS
Mathematical simulation of the cardiopulmonary system
[AD-A135460] N84-17822

SECONDARY EMISSION
Impact ionization effects on Pioneer Venus Orbiter N84-17270
Energy distributions and yields of secondary ions and electrons emitted by GIOTTO during Halley encounter N84-17272

SECONDARY FLOW
Comparison of secondary flows predicted by a viscous code and an inviscid code with experimental data for a turning duct
[NASA-TM-83575] N84-17142

SEDIMENT TRANSPORT
Nearshore current model workshop summary
[AD-A134702] N84-17791

SEDIMENTS
Acoustic data and uncertainty in geotechnical site characterization offshore
[PB84-100908] N84-17801

SEISMIC WAVES
Teleseismic array analysis of upper mantle compressional velocity structure
[NASA-CR-173285] N84-17723
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738
Strong motion effects due to seismic waves in dipping layers
[PB84-127919] N84-17747

Wave propagation study of the central Mediterranean Sea using ocean bottom seismometers
[AD-A135484] N84-17790

SEISMOLOGY
Shock wave properties of anorthosite and gabbro
[NASA-CR-173309] N84-17521
Homogeneous magnitude system of the Eurasian continent: S and L waves
[PB84-101161] N84-17744

SELECTION
On using selection procedures with binomial models
[AD-A135275] N84-17957
Nonparametric selection procedures for a two-way layout problem
[AD-A135385] N84-17962

SELF DIFFUSION (SOLID STATE)
Diffusion mechanisms in transition-metal oxides
[DE84-003460] N84-18081

SEMANTICS
Foundations of computer science 4. Distributed systems. Part 2: Semantics and logic
[MATH-CENTRE-TRACTS-159-PT-2] N84-17879
Processes and the denotational semantics of concurrency N84-17881
Ten years of Hoare's logic, a survey. Part 2: Nondeterminism N84-17882
The fairness problem and nondeterministic computing networks N84-17883
A demand-driven, coroutine-based implementation of a nonprocedural language N84-17895
Inquiry semantics: A functional semantics of natural language grammar
[AD-A135153] N84-17929

SEMICONDUCTOR DEVICES
Optimization of the parameters of the arc suppressing system of high-voltage apparatuses with a thyristor attachment
[BLL-OA-TRANS-3139-(6196.3)] N84-17476
Effects of space radiation on advanced semiconductor devices. Part 1: A review of current theories and practice in cosmic ray simulation
[G-2532-VOL-1] N84-17505
Chinese journal of infrared research (Selected articles)
[AD-A135504] N84-18051
Further delineation of the utilization of scientific literature by U.S. patents. Appendices A: Distribution of references contained in patents to various sources
[PB84-100742] N84-18096

SEMICONDUCTOR LASERS
Long wavelength InGaAsP/InP lasers and optoelectronic integration N84-17573

SEMICONDUCTORS (MATERIALS)
Ultrastructure processing and environmental stability of advanced structural and electronic materials
[AD-A135107] N84-17391
The use of diamond core saws in the electronics industry
[CSIR-TRANS-1702] N84-17417
Inexpensive solid-state trigger unit for thyratrons
[DE84-001424] N84-17501
Assessment of the potential of Langmuir-Blodgett films for room temperature IR (infrared) detectors
[AD-A134616] N84-17561
Elementary excitations in semiconductor superlattices structures N84-18065
Thermal conductivity of ternary and quaternary III-V compounds
[AD-A135336] N84-18070
High field transport of free carriers at the Si-SiO2 interface
[AD-A135338] N84-18071
Electron ballistic effects in III-V semiconductors
[AD-A135353] N84-18072
Spectroscopy of thermal energy transport
[AD-A134670] N84-18073

SENSITIVITY
The MRL small scale gap test for the assessment of shock sensitivity of high explosives
[MRL-R-896] N84-17408
Spas color camera
[NASA-CR-171739] N84-17559
Sensitivity and accuracy analysis of pulse diffusivity measurements on layered samples
[DE84-002104] N84-17584
A search for Earth-crossing asteroids
[NASA-CR-175374] N84-18139

SENSORS
Breadboard stellar tracker system test report
[NASA-CR-170973] N84-17166

SEPAC (PAYLOAD)
SEPAC: Spacelab Mission 1 report
[NASA-CR-170980] N84-17196

SEPARATED FLOW
Numerical study of a separating and reattaching flow by using Reynolds-stress tubulence closure
[NASA-CR-166547] N84-17133
Vapor-liquid phase separator studies
[NASA-CR-166545] N84-17527

SEQUENCING
Perfect numbers and aliquot sequences N84-17996

SEQUENTIAL ANALYSIS
Hierarchical cache accumulators for sequential mode estimation
[AD-A134698] N84-17908

SERIES EXPANSION
Applications of Non-Self-Adjoint operator theory to the Singularity Expansion Method (SEM) and to the Eigenmode Expansion Method (EEM) in acoustic and electromagnetic problems
[AD-A135177] N84-17955

SERVICE LIFE
Ceramic life prediction methodology - hot spin disc life program
[AD-A134783] N84-17400

SET THEORY
On acyclic database decompositions
[AD-A135105] N84-17887
Isotonic procedures for selecting populations better than a standard: Two-parameter exponential distributions
[AD-A135445] N84-17985
The program complexity of searching a table
[AD-A135299] N84-18104

SEWAGE
Flow technical problems with transitions between partial and complete filling and with flow measurement in channel sections. --- sewage flow
[TUM-SFB-81] N84-17552

SEYFERT GALAXIES
The physical nature of the continuum in active galaxies N84-18128

SH-3 HELICOPTER
Calculation of the aerodynamic flow field in the vicinity of a Sea King helicopter
[ARL-AERO-REPT-158] N84-17128

SHALLOW WATER
Methodology for the calculation of a shallow-water wave climate
[AD-A134715] N84-17792

SHAPE CONTROL
The 55-meter-structure flight experiment N84-17233
Shape optimal design and free boundary value problems N84-17516

SHAPES
Shape optimal design and free boundary value problems N84-17516

SHEAR CREEP
Determination of the viscoelastic shear modulus using forced torsional vibrations
[PB84-119700] N84-17638

SHEAR FLOW
Numerical study of a separating and reattaching flow by using Reynolds-stress tubulence closure
[NASA-CR-166547] N84-17133
Understanding transition to turbulence in shear layers
[AD-A134796] N84-17548
Baroclinic inertial instability in the non-static equilibrium atmosphere
[BLL-TRANS-1568-(9022.552)] N84-17751

SHEAR LAYERS
Understanding transition to turbulence in shear layers
[AD-A134796] N84-17548

SHEAR STRAIN
Determination of the viscoelastic shear modulus using forced torsional vibrations
[PB84-119700] N84-17638
Earth strain measurements with the transportable laser ranging system: Field techniques and planning
[NASA-CR-175150] N84-17725

SHIPS
The oceangoing space survey ship, the Wang Yuan
[AD-A135514] N84-17204
Achievement of electromagnetic compatibility in weapon systems --- ships N84-17430
Some parameters characterising the icing of ships from spray
[BLL-MO-TRANS-1570-(9022.552)] N84-17753
Reduction of propeller noise by a reflecting rubber layer --- ship propellers
[FOA-C-20506-E4] N84-18025

SHOCK HEATING
The time development of a blast wave with shock heated electrons
[NASA-CR-175364] N84-17529

SHOCK LOADS
The MRL small scale gap test for the assessment of shock sensitivity of high explosives
[MRL-R-896] N84-17408
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635
Metallic microwave conductivity in shock-loaded rutile
[DE84-002174] N84-18075

SHOCK WAVE INTERACTION
Interaction of weak shock waves and discrete gas inhomogeneities N84-17517

SHOCK WAVE PROPAGATION
Shock wave properties of anorthosite and gabbro
[NASA-CR-173309] N84-17521
Rapporteur paper for sessions MG1, MG3 and MG4: Modulation theory, interplanetary propagation and interplanetary acceleration
[NASA-TM-86047] N84-18150

SHOCK WAVES
Spectral methods for the Euler equations: Chebyshev methods and shock-fitting
[NASA-CR-172295] N84-17118
Technique for the rapid generation of OH radicals behind shock waves and its application to the study of combustion kinetics
[DE84-003183] N84-17317
Dynamic consolidation of ceramic powders: Practicalities, problems, and prospects
[DE84-003744] N84-17404
Electron acceleration in the front of intense collisionless shock waves
[PR-813] N84-17511
The time development of a blast wave with shock heated electrons
[NASA-CR-175364] N84-17529
Numerical simulation of flow over rough surfaces, including effects of shock waves
[AD-A134700] N84-17545
Electrical-shock prevention. Volume 1: Protection of maintenance personnel
[PB84-102948] N84-17865
Electrical-shock prevention. Volume 4: Overhead-line contact fatalities
[PB84-102979] N84-17868
A comparison of explicit time integration techniques for the finite element shock wave equations
[AD-A134757] N84-17968
Combined ultraviolet studies of astronomical sources
[NASA-CR-175377] N84-18121
Power spectral signatures of interplanetary corotating and transient flows
[NASA-TM-86051] N84-18131

SHOT NOISE
Shot noise generated by gas impact during a cometary fly-by --- Vega Halley's comet flyby N84-17273

SHROUDS
Characteristics of a four nozzle, slotted mixing stack with slanted shroud, gas eductor system
[AD-A134794] N84-17547

SHUTTLE PALLET SATELLITES
Spas color camera
[NASA-CR-171739] N84-17559

SIDE-LOOKING RADAR
APQ-102 imaging radar digital image quality study
[NASA-CR-171738] N84-17435

SIGNAL DETECTION
Signal detection for same-shape families of non-homogeneous Poisson processes
[AD-A135032] N84-17942
Auditory induction of discrete tones in signal detection tasks
[AD-A135502] N84-18019

SIGNAL ENCODING
Investigation of encryptation for satellite communications
[FOA-C-30300-E1] N84-17457

SIGNAL GENERATORS
Automated acceptance test procedures for wideband microwave synthesized signal generator testing
[AD-A134923] N84-17563

SIGNAL PROCESSING
Test Operations Procedure: Signal converters
[AD-A134615] N84-17446
Sampling mismatch and timing jitter in pulse-Doppler radar
[AD-A134683] N84-17447
V-band integrated quadriphase modulator
[NASA-CR-175159] N84-17480
Research Laboratory of Electronics
[AD-A135319] N84-17488
RLE (Research Laboratory of Electronics)
[AD-A134812] N84-17495
An active filter primer
[AD-A134838] N84-17498
Temporal aspects of eye movement when viewing multiple targets
[AD-A134853] N84-17828
Introduction to acoustic emission
[NASA-TM-77088] N84-18016
Quantification of interference and detectability properties of visual stimuli for optimal display design
[AD-A135438] N84-18049
Control and identification of time varying systems
[AD-A135223] N84-18091

SIGNAL REFLECTION
Acoustic imaging of vapor bubbles through optically non-transparent media
[DE84-003961] N84-18022
SILANES
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reaction flows
[NASA-CR-175365] N84-17520
SILICON
Method and apparatus for the rapid determination of gases, oxygen in particular, and of the combined forms in which they are present in metals
[BLL-OA-TRANS-3127-(6196.3)] N84-17340
The practical use of data as to the solution enthalpies of molten Fe-V-Si
[BLL-M-35430-(5828.4)] N84-17342
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358
Synthesis of phosphorus-nitrogen polymers using Si-N-P reagents
[AD-A135224] N84-17392
High field transport of free carriers at the Si-SiO2 interface
[AD-A135338] N84-18071
SILICON CARBIDES
Ion beam modification of ceramics
[DE84-003302] N84-17403
SILICON COMPOUNDS
An investigation of the thermodegradation of ablative organic silicon resin
[AD-A135546] N84-17397
SILICON NITRIDES
Ceramic components for gas turbines, phase 2
[BMFT-FB-T-83-196] N84-17183
SILICON OXIDES
High field transport of free carriers at the Si-SiO2 interface
[AD-A135338] N84-18071
SILICONE RUBBER
Development or a solar cell coverglass adhesive for space application
[BMFT-FB-W-83-029] N84-17695
SIMILARITY THEOREM
Similar velocity profiles and integral quantities of a boundary layer on a rotating cylinder
[VKI-NT-148] N84-17553
SIMULATION
Experimental water tunnel with density stratification for the simulation of small-scale atmospheric flows
[BLL-RISLEY-TR-4871-(9091.9F)] N84-17188
Project DELUGE: The development of a Holloman high speed test track heavy rainfield
[AD-A134810] N84-17205
Project DELUGE: A proposed mathematical model for the Holloman AFB test track simulated rainfield
[AD-A134891] N84-17207
Nuclear explosion effects on telecommunication, etc. (effect of EMP and of ionizing radiation on electronics and optical electronics
[FOA-C-30302-A3] N84-17458
SIMULATORS
SAPIENS MEMO 5: The mechanical design of the EMP-simulator SAPIENS
[FOA-C-30320-A3] N84-17192
SINE WAVES
Inversion of ringdown data for a rotating liquid cylinder
[AD-A134742] N84-17546
SINGLE CRYSTALS
Factors which influence directional coarsening of Gamma prime during creep in nickel-base superalloy single crystals
[NASA-TM-83595] N84-17353
Influence of composition on the microstructure and mechanical properties of a nickel-base superalloy single crystal
[NASA-TM-83563] N84-17354
Ion beam modification of ceramics
[DE84-003302] N84-17403
Thermocapillary flows and their stability: Effects of surface layers and combination
[NASA-CR-170962] N84-17522
SINGULARITY (MATHEMATICS)
Applications of Non-Self-Adjoint operator theory to the Singularity Expansion Method (SEM) and to the Eigenmode Expansion Method (EEM) in acoustic and electromagnetic problems
[AD-A135177] N84-17955
SIRIO SATELLITE
Model mission study for laser synchronization of clocks
[SNIAS-221-CA/LP] N84-17569
SIRS B SATELLITE
Current trends and research challenges in land remote sensing N84-17651
SITE SELECTION
Conductivity mapping of underground flow channels and moisture anomalies in carbonate terrain using electromagnetic methods
[DE84-004096] N84-17677
Estimation of small area populatons using remote sensing and other approaches
[DE84-003404] N84-17678
SIZE DETERMINATION
Look at techniques for the dimensional calibration of standard microscopic particles
[PB84-112648] N84-17324
SIZE DISTRIBUTION
Vapor-liquid phase separator studies
[NASA-CR-166545] N84-17527
SKIN (STRUCTURAL MEMBER)
Friction and wear behavior of aluminum and composite airplane skins
[NASA-TP-2262] N84-17175
SKY BRIGHTNESS
Dual channel water vapor radiometer system
[PB84-119445] N84-17748
SLEEP
Effect of the microclimate on the night sleep and physical fitness of seamen during a cruise in the low latitudes N84-17813
SLEEP DEPRIVATION
Extending human effectiveness during sustained operations through sleep management
[AD-A134782] N84-17825
SLIDING
Hydrodynamic lubrication of rigid nonconformal contacts in combined rolling and normal motion
[NASA-TM-83578] N84-17592
SLIDING CONTACT
Hydrodynamic lubrication of rigid nonconformal contacts in combined rolling and normal motion
[NASA-TM-83578] N84-17592
SLIDING FRICTION
Study of the lubrication mechanism of thin film lubricated concentrated steel contacts. The influence of pre-treatment of the steel on the load carrying capacity
[AD-A135067] N84-17593
SLOPES
A study of the dependence of radar backscatter cross section on wind speed and wave slope from the MARSEN experimental results (a contribution to studies of radar backscattering from the sea surface). Supplement to final report
[AD-A135041] N84-17441
SMOKE
The effect of smoking on the non-specific resistance of the organism of seamen at sea N84-17816
SNOW
Synoptic meteorology during the SNOW-ONE-A field experiment
[AD-A134888] N84-17762
Probable maximum precipitation and snowmelt criteria for southeast Alaska
[PB84-104371] N84-17777
SNOW COVER
Snow and ice monitoring by microwave techniques N84-17660
SODIUM VAPOR
Theoretical studies of solar-pumped lasers
[NASA-CR-173283] N84-17576
SOFTWARE ENGINEERING
IMCS reflight certification requirements and design specifications
[NASA-CR-170968] N84-17167
SOFTWARE TOOLS
Automatic synthesis of abstract data type implementations from abstract specifications N84-17896
SOIL MOISTURE
Microwave dielectric constant dependence on soil tension
[AD-A134651] N84-17673
A climatically-derived global soil moisture data set for use in the GLAS atmospheric circulation model seasonal cycle experiment
[NASA-CR-173289] N84-17729
SOILS
Soil characterization and evaluation at White Sands Missile Range, New Mexico
[AD-A134820] N84-17206
Remote sensing for agriculture and land use N84-17666
Transport of water in frozen soil. I: Experimental determination of soil-water diffusivity under isothermal conditions
[AD-A135419] N84-17671
Reactivity of TNT and TNA-microbial reduction products with soil components
[AD-A135512] N84-17698
Subsidence monitoring for state of Arizona
[PB84-126960] N84-17750
SOLAR ACTIVITY EFFECTS
Rapporteur paper for sessions MG1, MG3 and MG4: Modulation theory, interplanetary propagation and interplanetary acceleration
[NASA-TM-86047] N84-18150
SOLAR ARRAYS
The STEP/STACBEAM experiment technology development for very large solar array deployers N84-17220
Photovoltaic concentrator pointing dynamics and plasma interaction study N84-17224
A deployable structure and solar array controls experiment for STEP N84-17227
Integrated Power/Attitude Control System (IPACS) technology experiment N84-17229
SOLAR CELLS
Advanced photovoltaic system simulator to demonstrate the performance of advanced photovoltaic cells and devices
[DE83-009405] N84-17688
Linear Fresnel lens photovoltaic concentrator program
[DE84-002971] N84-17689
Study of thermal fatique of soldered photovoltaic cells by thermal resistance measurement
[DE84-003764] N84-17692
Development of technologies for very thin solar cells
[BMFT-FB-W-83-024] N84-17694
Development or a solar cell coverglass adhesive for space application
[BMFT-FB-W-83-029] N84-17695
SOLAR COLLECTORS
Photovoltaic concentrator pointing dynamics and plasma interaction study N84-17224
Support development program for the qualification of solar farm collectors
[BMFT-FB-T-83-207] N84-17696
SOLAR CONSTANT
Space research in Switzerland N84-17200
SOLAR ENERGY
In vitro chlorophyll photosynthetic reaction
[PB84-104892] N84-17810
SOLAR ENERGY CONVERSION
Photochemical energy storage (photosensitized isomerization of norbornadiene to quadricyclane by copper (I) complexes)
[AD-A135363] N84-17687
SOLAR FLARES
The isotopic composition of energetic particles emitted from a large solar flare N84-18140
The interpretation of hard X-ray polarization measurements in solar flares
[NASA-CR-172790] N84-18142
Solar-geophysical data center number 467, July 1983, part 1 (prompt reports). Data for June 1983, May 1983 and late data
[PB84-100486] N84-18144
Solar-geophysical data number 467, July 1983, part 2 (comprehensive reports). Data for January 1983, November 1980 and miscellanea
[PB84-100494] N84-18145
SOLAR FLUX
NIMBUS-7 SBUV (Solar Backscatter Ultraviolet) observations of solar UV spectal irradiance variations caused by solar rotation and active-region evolution for the period November 7, 1978 - October 26, 1979
[PB84-108166] N84-17743
SOLAR MAGNETIC FIELD
Solar-geophysical data center number 467, July 1983, part 1 (prompt reports). Data for June 1983, May 1983 and late data
[PB84-100486] N84-18144
SOLAR RADIATION
Theoretical studies of solar-pumped lasers
[NASA-CR-173283] N84-17576
The retrieval of atmospheric constituent mixing-ratio profiles from solar absorption spectra
[NASA-CR-173303] N84-17730
Light scattering condensation nuclei, and air mass trajectories at Whiteface Mountain: Summer 1982
[PB84-104363] N84-17742
NIMBUS-7 SBUV (Solar Backscatter Ultraviolet) observations of solar UV spectal irradiance variations caused by solar rotation and active-region evolution for the period November 7, 1978 - October 26, 1979
[PB84-108166] N84-17743
A determination of the constants for a second-order closure turbulence model from geophysical data
[AD-A134826] N84-17795
Proposals for VIRA (Venus International Reference Atmosphere): Solar and thermal radiation
[PR-829] N84-18135

SOLAR RADIO EMISSION
Solar-geophysical data number 467, July 1983, part 2 (comprehensive reports). Data for January 1983, November 1980 and miscellanea
[PB84-100494] N84-18145
SOLAR SIMULATORS
Threshold kinetics of a solar-simulator-pumped iodine laser
[NASA-TP-2241] N84-17575
SOLAR SPECTRA
NIMBUS-7 SBUV (Solar Backscatter Ultraviolet) observations of solar UV spectal irradiance variations caused by solar rotation and active-region evolution for the period November 7, 1978 - October 26, 1979
[PB84-108166] N84-17743
Effects of systematic errors on the mixing ratios of trace gases obtained from occulation spectra
[NASA-CR-175371] N84-18046
SOLAR WIND
Space research in Switzerland N84-17200
The potential of ISEE in different plasma environments N84-17257
SOLAR X-RAYS
The interpretation of hard X-ray polarization measurements in solar flares
[NASA-CR-172790] N84-18142
SOLDERED JOINTS
Study of thermal fatique of soldered photovoltaic cells by thermal resistance measurement
[DE84-003764] N84-17692
SOLENOIDS
Ultra-high-field superconducting magnets
[DE84-003913] N84-18012
SOLID ELECTROLYTES
Chloride ion conductivity in a plasticized quaternary ammonium polymer
[AD-A135373] N84-17305
Ionic conductivity of Li7BiO6
[AD-A135386] N84-17307
SOLID PROPELLANT ROCKET ENGINES
Inertial Upper Stage (IUS) Solid Rocket Motor (SRM) core flow sampling at high altitudes
[AD-A134997] N84-17288
Investigation of free jets issued from small solid propellant rocket engines N84-17290
SOLID STATE
The 20 GHz spacecraft FET solid state transmitter
[NASA-CR-168240] N84-17477
Growth and evaluation of AgGaS2 and AgGaSe2 for infrared nonlinear applications
[NASA-CR-175185] N84-18066
SOLID STATE DEVICES
Heterojunction solid-state devices for millimeter-wave sources
[AD-A135389] N84-17490
State-of-the-art of solid-state motor controllers. Part 4: Failure-rate and failure-mode data
[DE84-001022] N84-17502
SOLID-SOLID INTERFACES
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358
SOLIDS
On the propagation laws of combustion waves in solids (pyrotechnic reactions)
[BLL-TRANS-1098-(7291.796S)] N84-17300
Preliminary investigation of an electrical network model for ultrasonic scattering
[NASA-CR-3770] N84-17606
SOLITARY WAVES
Solitary waves in water colliding head-on
[AD-A135537] N84-17964
Mean field theory of the linear sigma-model: Chiral solitons
[DE84-002864] N84-18034
SOLUTES
Segregation of Zn solutes to high-angles (001) twist grain boundaries in Al
[DE84-003455] N84-17375
SOLUTIONS
Smoothness of bounded solutions of nonlinear evolution equations
[AD-A135294] N84-17958
SOLVENT EXTRACTION
New process for recycling of rhodium and iridium from old catalysts
[BMFT-FB-T-83-179] N84-17321
Applications of solvent extraction in hydrometallurgy
[BLL-OA-TRANS-3162-(6196.3)] N84-17334
SOUND TRANSDUCERS
Introduction to acoustic emission
[NASA-TM-77088] N84-18016
SOUND TRANSMISSION
Digital sound service for direct broadcasting satellites N84-17462
SOUNDING ROCKETS
Ion source for a rocket payload
[AD-A135051] N84-17289
SPACE CHARGE
Virtual cathode oscillations
[AD-A135120] N84-18027
Preliminary tests of a second harmonic RF system for the intense pulsed neutron source synchrotron
[DE84-003595] N84-18041
SPACE COMMUNICATION
Proceedings of the Symposium on Military Space Communications and Operations
[AD-A135021] N84-17439
SPACE ENVIRONMENT SIMULATION
Laboratory measurement of impact ionization N84-17271
Development of a modular battery
[BMFT-FB-W-83-021] N84-17504
Effects of space radiation on advanced semiconductor devices. Part 1: A review of current theories and practice in cosmic ray simulation
[G-2532-VOL-1] N84-17505
Effects of space radiation on advanced semiconductor devices. Part 2: Cosmic ray simulation experiments for the study of single event upsets in CMOS technology
[G-2745-VOL-2] N84-17506
SPACE ERECTABLE STRUCTURES
Erectable beam experiment N84-17219
The STEP/STACBEAM experiment technology development for very large solar array deployers N84-17220
Low concentration ratio solar array structural configuration N84-17225
Development of Test Article Building Block (TABB) for deployable platform systems N84-17226
A deployable structure and solar array controls experiment for STEP N84-17227
SPACE EXPLORATION
Research and technology report, 1983
[NASA-TM-85865] N84-18152
SPACE FLIGHT
Energy balance and the composition of weight loss during prolonged space flight
[NASA-CR-171745] N84-17820
SPACE INDUSTRIALIZATION
Space commercialization
[GPO-26-498] N84-17194
SPACE MAINTENANCE
Preventive maintenance on space systems
[AD-A134955] N84-17198
An investigation of non-extravehicular activity (Non-EVA) on-orbit maintenance support concepts for orbiting systems
[AD-A134957] N84-17199
SPACE PERCEPTION
Results of a slant range visibility field test in Munich-Reim
[DFVLR-MITT-83-09] N84-17169
SPACE PLASMAS
Optical, radio and computer simulation studies of the Brazil ionospheric modification experiment of 8 September 1982
[AD-A135143] N84-17731
SPACE PLATFORMS
Development of Test Article Building Block (TABB) for deployable platform systems N84-17226
A deployable structure and solar array controls experiment for STEP N84-17227
STEP flight experiments Large Deployable Reflector (LDR) telescope N84-17231
Flight test of a synthetic aperture radar antenna using STEP N84-17237
SPACE POWER REACTORS
SP-100 program: Space reactor system and subsystem investigations
[DE84-003217] N84-18045
SPACE PROCESSING
Review of materials processing in space, 1983
[GPO-27-914] N84-17193
NBS (National Bureau of Standards): Materials measurements — space processing experiments
[NASA-CR-173162] N84-17384
SPACE PROCESSING APPLICATIONS ROCKET
Space Processing Applications Rocket (SPAR) project, SPAR 9
[NASA-TM-82549] N84-17239
SPACE PROGRAMS
The national space program from the fifties into the eighties
[AD-A134799] N84-17197
SPACE RENDEZVOUS
Development of an autonomous video rendezvous and docking system, phase 3
[NASA-CR-170969] N84-17249
SPACE SHUTTLE MAIN ENGINE
SSME structural dynamic model development
[NASA-CR-170960] N84-17287
SPACE SHUTTLE ORBITERS
Shuttle on-orbit dynamics N84-17216
In-flight load testing of advanced shuttle thermal protection systems
[NASA-TM-86024] N84-17250
Interaction of the space shuttle orbiter with the ionospheric plasma N84-17265
SPACE SHUTTLE PAYLOADS
Shuttle on-orbit dynamics N84-17216
General requirements for Shuttle flight experiments N84-17221
SPACE SHUTTLES
Space Shuttle ice suppression system validation, volume 1
[NASA-CR-171740] N84-17244
Space Shuttle ice suppression system validation, volume 2
[NASA-CR-171741] N84-17245
Space Shuttle ice suppression system validation, volume 3
[NASA-CR-171742] N84-17246
Implications of joint NASA/DOD participation in Space Shuttle operations
[PB84-122472] N84-17286
NSI-1 Squib adapter development and final test report for usage on space shuttle gas sampler valve/bottle assembly 3270
[NASA-CR-171735] N84-17556
SPACE STATIONS
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
Space Technology Experiments Platform (STEP) overview N84-17212
STEP mechanical systems N84-17213
STEP experiment integration N84-17215
Deployable beam flight experiment (MAST) N84-17218
Erectable beam experiment N84-17219
Integrated Power/Attitude Control System (IPACS) technology experiment N84-17229
User manual of the CATSS system (version 1.0) communication analysis tool for space station
[NASA-CR-171728] N84-17431
Airborne antenna pattern calculations
[NASA-CR-173284] N84-17436
SPACE TRANSPORTATION
Preventive maintenance on space systems
[AD-A134955] N84-17198
SPACE TRANSPORTATION SYSTEM
Space Technology Experiments Platform (STEP) overview N84-17212
STEP electronic system design N84-17214
National Aeronautics and Space Administration Act, 1985 N84-18116
SPACE TRANSPORTATION SYSTEM 3 FLIGHT
Interaction of the space shuttle orbiter with the ionospheric plasma N84-17265
SPACE-TIME FUNCTIONS
A study of waves on a curved space-time N84-18083
SPACEBORNE EXPERIMENTS
A new dimension in space experimentation
[NASA-NF-140] N84-17210
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
The STEP/STACBEAM experiment technology development for very large solar array deployers N84-17220
General requirements for Shuttle flight experiments N84-17221
Thermal energy management process experiment N84-17222
Canadian Attitude Sensing Experimental Package (CASEP) N84-17223
Photovoltaic concentrator pointing dynamics and plasma interaction study N84-17224
A deployable structure and solar array controls experiment for STEP N84-17227
Vibration isolation technology experiment N84-17228
STEP flight experiments Large Deployable Reflector (LDR) telescope N84-17231
Large deployable antenna flight experiment for the Space Technology Experiments Platform (STEP) N84-17232
Large inflated-antenna system N84-17234
Adaptive microwave reflector N84-17235
Microwave reflector characterization using simple instruments in EVA N84-17236
Flight test of a synthetic aperture radar antenna using STEP N84-17237
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 1: Executive summary
[ERC-RP-200-DS-009-VOL-1] N84-17423

Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 2: Technical descriptions [ERC-RP-200-DS-009-VOL-2] N84-17424
SPACEBORNE PHOTOGRAPHY
Investigation of encryptation for satellite communications [FOA-C-30300-E1] N84-17457
Requirements for spaceborne remote sensing in geology N84-17657
SPACEBORNE TELESCOPES
ROSAT-FI design review [MPE-39] N84-17209
STEP flight experiments Large Deployable Reflector (LDR) telescope N84-17231
SPACECRAFT ANTENNAS
Large deployable antenna flight experiment for the Space Technology Experiments Platform (STEP) N84-17232
Large inflated-antenna system N84-17234
Study on large, ultralight long-life structures in space, phase 2C [TM-EKR3] N84-17284
Airborne antenna pattern calculations [NASA-CR-173284] N84-17436
Spline-based estimation techniques for parameters in elliptic distributed systems [NASA-TM-85439] N84-17947
SPACECRAFT CHARGING
Spacecraft/plasma interactions and their influence on field and particle measurements — conferences [ESA-SP-198] N84-17253
A review of SCATHA satellite results: Charging and discharging N84-17254
Probe measurement of DC electric fields — SCATHA satellite charging N84-17255
Anomalously high potentials observed on ISEE N84-17258
Charging effects observed on Voyager 1 near Jupiter N84-17260
Ion measurements on GEOS using a negatively biased sensor on a positively charged spacecraft N84-17263
Contributions to satellite sheath and wake modeling N84-17266
NASCAP simulations of spacecraft charging of the SCATHA satellite — NASA (spacecraft) charging analyzer program (NASCAP) N84-17268
The role of potential barrier formation in spacecraft charging N84-17269
Laboratory measurement of impact ionization N84-17271
A model of electrostatic charging and sheath structure of GIOTTO near Halley's comet N84-17274
The concepts of critical temperature and energy cutoff of ambient electrons in high voltage charging of spacecraft N84-17275
A potential control method for thermal plasma measurements on the DE-1 spacecraft N84-17276
Methods for keeping a conductive spacecraft near the plasma potential N84-17277
Active control of the potential of ISEE-1 by an electron gun N84-17278
Proceedings of the Air Force Geophysics Laboratory Workshop on Natural Charging of Large Space Structures in Near Earth Polar Orbit [AD-A134894] N84-17281
SPACECRAFT COMMUNICATION
Carrier acquisition and tracking by a COSTAS-loop with automatic frequency control [DFVLR-FB-83-24] N84-17202
User manual of the CATSS system (version 1.0) communication analysis tool for space station [NASA-CR-171728] N84-17431
Investigation of encryptation for satellite communications [FOA-C-30300-E1] N84-17457
Correlative phase modulation for fixed satellite services, volume 1 (phase 1) [PTI-SB-2363-21-3505-VOL-1] N84-17465
FM spectral modeling and FDM/FM simulation programs [PB84-118934] N84-17469
The 20 GHz spacecraft FET solid state transmitter [NASA-CR-168240] N84-17477
V-band integrated quadriphase modulator [NASA-CR-175159] N84-17480
SPACECRAFT CONSTRUCTION MATERIALS
Composite structural materials [NASA-CR-173259] N84-17293
SPACECRAFT CONTROL
Integrated Power/Attitude Control System (IPACS) technology experiment N84-17229
Study of Attitude Control and Guidance System (ACGS) for orbit change stage [ESA-CR(P)-1797] N84-17285
SPACECRAFT DESIGN
Study on large, ultralight long-life structures in space, phase 2C [TM-EKR3] N84-17284
SPACECRAFT DOCKING
Development of an autonomous video rendezvous and docking system, phase 3 [NASA-CR-170969] N84-17249
SPACECRAFT ELECTRONIC EQUIPMENT
Preparation of standard electrical testability provisions for space equipment. Volume 1: Executive summary [DM.51/CV/JP/327.83-VOL-1] N84-17507
Preparation of standard electrical provisions for space equipments [DM.51/CV/JP/327.83-VOL-2] N84-17508
SPACECRAFT GUIDANCE
Study of Attitude Control and Guidance System (ACGS) for orbit change stage [ESA-CR(P)-1797] N84-17285
SPACECRAFT ORBITS
Shuttle on-orbit dynamics N84-17216
SPACECRAFT POWER SUPPLIES
Integrated Power/Attitude Control System (IPACS) technology experiment N84-17229
Power subsystem automation study [NASA-CR-170974] N84-17686
SPACECRAFT RADIATORS
Thermal energy management process experiment N84-17222
Development of a contact heat exchanger for a constructable radiator system [NASA-CR-171730] N84-17523
SPACELAB
SEPAC: Spacelab Mission 1 report [NASA-CR-170980] N84-17196
STEP mechanical systems N84-17213
SPACELAB PAYLOADS
An Attached Payload Operations Center (APOC) at the Goddard Space Flight Center (GSFC), volume 2 [NASA-CR-175160-VOL-2] N84-17203
Remote sensing experiments on Spacelab and STS N84-17655
SPARROW 3 MISSILE
Aerodynamic characteristics of a Sparrow 3 missile model in the flow field of a generalized parent body at Mach 2.86 [NASA-TM-85713] N84-17134
SPATIAL FILTERING
A model for ordinal filtering of digital images [AD-A134705] N84-18052
SPECIFIC HEAT
Equation of state of fluid NH-3 from P-V-T and ultrasound measurements to 12 kbar [DE83-015913] N84-17316
Hydrogen sulfide provisional thermophysical properties from 188 to 700 K at pressures to 75 MPa [PB84-122704] N84-17329
SPECIFICATIONS
Initial graphics exchange specification test library, version 1.3 [PB84-102144] N84-17922
SPECKLE PATTERNS
Time-varying speckle phenomena in astronomical imaging and in laser scattering N84-18118
SPECTRA
A catalogue of spreading modulation spectra [AD-A134850] N84-17454
FM spectral modeling and FDM/FM simulation programs [PB84-118934] N84-17469
SPECTRAL RESOLUTION
Comparison of the information content of data from the LANDSAT 4 Thematic Mapper and the multispectral scanner [E84-10081] N84-17641
A search for Earth-crossing asteroids [NASA-CR-175374] N84-18139
SPECTRAL SENSITIVITY
A laboratory investigation of the reflective properties of simulated, optically thick clouds [NASA-CR-175362] N84-17755
SPECTRUM ANALYSIS
Spectral methods for the Euler equations: Chebyshev methods and shock-fitting [NASA-CR-172295] N84-17118
SPEECH
Jam-resistant speech encoding [AD-A134707] N84-17448
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1 [AD-A135232] N84-17485
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2 [AD-A135233] N84-17486
SPEECH RECOGNITION
Human factors issues associated with the use of speech technology in the cockpit [NASA-CR-166548] N84-17433
VLSI research [AD-A134628] N84-17491
SPEED CONTROL
Optimal electric drive control to suppress jerking [BLL-M-35391-(5828.4)] N84-17589
SPHERICAL ANTENNAS
An analytical study of cylindrical- and spherical-rectangular microstrip antennas N84-17428
SPILLING
Design of a remotely controlled hovercraft vehicle for spill reconnaissance [PB84-124064] N84-17187
SPIN DYNAMICS
Homogeneity and magnetic susceptibility in some substituted cadmium spinels [AD-A135297] N84-17357
SPINDLES
Distribution of unit pressures in universal spindle joint N84-17588
SPIRAL GALAXIES
Formation of dust lanes in spiral galaxies by radiation pressure N84-18130
Limits on diffuse X-ray emission from M101 [NASA-CR-173277] N84-18147
SPLINE FUNCTIONS
Spline-based estimation techniques for parameters in elliptic distributed systems [NASA-TM-85439] N84-17947
Use of the Bernstein form to derive sufficient conditions for shape preserving piecewise polynomial interpolation [DE84-003914] N84-17972
SPONTANEOUS EMISSION
The evolution of spontaneous and coherent radiation in the free electron laser oscillator [AD-A134458] N84-17583
SPOT (FRENCH SATELLITE)
Current trends and research challenges in land remote sensing N84-17651
SPOT (French satellite) — satellite and program overviews N84-17652
Typical SPOT data and products: Potential applications N84-17653
SPRAY CHARACTERISTICS
Some parameters characterising the icing of ships from spray [BLL-MO-TRANS-1570-(9022.552)] N84-17753
SPRAY CONDENSERS
Estimation of parameters of spray clouds [BLL-TRANS-1571-(9022.552)] N84-17752
SPRAYERS
Estimation of parameters of spray clouds [BLL-TRANS-1571-(9022.552)] N84-17752
SPREAD SPECTRUM TRANSMISSION
Jam-resistant speech encoding [AD-A134707] N84-17448
SPUTTERING
Study of ion bombardment-induced subsurface compositional modifications in Ni-Cu alloys at elevated temperatures by ion scattering spectroscopy [DE84-003632] N84-17380
Velocity and electronic state distributions of sputtered Fe atoms by laser-induced fluorescence spectroscopy [DE84-003649] N84-18040
SQUEEZE FILMS
The Shock and Vibration Digest, volume 15, no. 9 [AD-A134750] N84-17609
Squeeze-film damping of rotor-dynamic systems N84-17610
SQUIBS
NSI-1 Squib adapter development and final test report for usage on space shuttle gas sampler valve/bottle assembly 3270 [NASA-CR-171735] N84-17556
STABILITY
Wind-tunnel free-flight investigation of a model of a forward-swept-wing fighter configuration [NASA-TP-2230] N84-17184
Bifurcation and stability theory with application to problems of combustion and flame propagation [AD-A135383] N84-17306
Ultrastructure processing and environmental stability of advanced structural and electronic materials [AD-A135107] N84-17391
Evaluation of Chem-Crete high strength modified asphalt concentrate [PB84-105089] N84-17636
STABILIZATION
Investigation of electrodynamic stabilization and control of long orbiting tethers [NASA-CR-170972] N84-17251

STABILIZERS (FLUID DYNAMICS)
IRAAM wind tunnel test, task 3
[AD-A135256] N84-17148
STACKS
Characteristics of a four nozzle, slotted mixing stack with slanted shroud, gas eductor system
[AD-A134794] N84-17547
Dispersion experiments with sulfur hexafluoride from the 213m high meteorological mast at Cabauw in the Netherlands N84-17706
STAINLESS STEELS
Correlation of yield stress changes in 316 stainless steel irradiated with high-energy and fission neutrons
[DE84-002115] N84-17368
Friction and wear reduction of 440C stainless steel by ion implantation
[DE84-003255] N84-17371
Effects of nominal and crack-tip strain rate on IGSCC susceptibility in CERT tests
[DE84-004006] N84-17378
Correlation of fracture toughness with tensile properties for irradiated 20% cold-worked 316 stainless steel
[DE84-003954] N84-17379
Aging degradation of cast stainless steel: Status and program
[DE84-004018] N84-17381
STAMPING
Multi-transition stamping of components with thin body and tall stiffening ribs
[BLL-M-35384-(5828.4)] N84-17415
STANDARD DEVIATION
Thermophysical properties of gaseous carbon dioxide/water mixtures
[PB84-125228] N84-17330
STANDARDIZATION
Preparation of standard electrical testability provisions for space equipment. Volume 1: Executive summary
[DM.51/CV/JP/327.83-VOL-1] N84-17507
Preparation of standard electrical provisions for space equipments
[DM.51/CV/JP/327.83-VOL-2] N84-17508
National Bureau of Standards Journal of Research, volume 88, no. 4, July - August 1983
[PB84-115849] N84-17571
Guide to meteorological instruments and methods of observation
[WMO-8] N84-17764
Automated data base implementation requirements for the avionics planning baseline, Army
[AD-A135259] N84-18103
STANDARDS
Synopsis and recommendations of the TSC Workshop on differential operation of NAVSTAR GPS, June 1983
[PB84-121599] N84-17170
Look at techniques for the dimensional calibration of standard microscopic particles
[PB84-112648] N84-17324
Heat pump units with electrically driven compressors for water heating
[BLL-OA-TRANS-3181-(6196.3)] N84-17514
Review of the National Ambient Air Quality Standards for sulfur oxides: Assessment of scientific and technical information
[PB84-102920] N84-17711
Measurement of robot accuracy using the Latin Square Three-Dimensional Ball Plate
[DE84-004920] N84-17862
STAR TRACKERS
Breadboard stellar tracker system test report
[NASA-CR-170973] N84-17166
Canadian Attitude Sensing Experimental Package (CASEP) N84-17223
STARS
Stellar Ultraviolet Rocket Research Program --- faint object spectrograph
[NASA-CR-175361] N84-18119
First, second and third Herstmonceux catalogues of stars for 1950.0
[BULL-189] N84-18125
STARTING
High capacity heat pipe performance demonstration
[NASA-CR-171733] N84-17531
STATIC PRESSURE
Hot-flow tests of a series of 10-percent-scale turbofan forced mixing nozzles
[NASA-TP-2268] N84-17525
STATIONS
Physical oceanography report STD data from drifting ice station Fram 1
[AD-A134244] N84-17797
STATISTICAL ANALYSIS
FAA (Federal Aviation Administration) statistical handbook of aviation. Calender year 1982
[PB84-127323] N84-17124
Preventive maintenance on space systems
[AD-A134955] N84-17198
Civilian residential fire fatality rates: Six high-rate states versus six low-rate states
[PB84-102615] N84-17427
Noise
[AD-A135066] N84-17983
STATISTICAL DISTRIBUTIONS
Isotonic procedures for selecting populations better than a standard: Two-parameter exponential distributions
[AD-A135445] N84-17985
STATISTICS
Two-level compromise designs for estimating main effects and detecting interactions
[DE84-002997] N84-18094
STATORS
A mathematical model for the doubly-fed wound rotor generator, part 2
[NASA-TM-83581] N84-17479
STEADY STATE
Numerical computation of steady state scattered sound external to submerged infinite cylinders by combining finite element and integral equation methods
[AD-A134773] N84-18020
STEELS
Tempering kinetics of alloy steels as a function of quench rate and M sub s temperature
[AD-A134806] N84-17365
Study of the lubrication mechanism of thin film lubricated concentrated steel contacts. The influence of pre-treatment of the steel on the load carrying capacity
[AD-A135067] N84-17593
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 1
[AD-A135387] N84-17626
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 2
[AD-A135388] N84-17627
STEERABLE ANTENNAS
Comparative antenna measurements in real environment: Steerable null antenna at 30 - 76 MHz
[FOA-C-30303-E2] N84-17459
STELLAR CORONAS
Evidence linking coronal mass ejections with interplanetary magnetic clouds
[NASA-TM-82564] N84-18141
STELLAR LUMINOSITY
Luminosity calibration of low redshift quasars
[NASA-CR-175372] N84-18120
STELLAR MASS
Narrow-band photometry of faint red stars, 2
[BULL-191] N84-18126
STELLAR MASS ACCRETION
Models of the hard X-ray spectrum of AM Herculis and implications for the accretion rate
[NASA-TM-86045] N84-18123
STELLAR MASS EJECTION
Evidence linking coronal mass ejections with interplanetary magnetic clouds
[NASA-TM-82564] N84-18141
STELLAR MOTIONS
First, second and third Herstmonceux catalogues of stars for 1950.0
[BULL-189] N84-18125
STELLAR OCCULTATION
Determination of individual temperatures and luminosities in eclipsing binary star systems
[AD-A134182] N84-18133
STELLAR SPECTRA
Stellar Ultraviolet Rocket Research Program --- faint object spectrograph
[NASA-CR-175361] N84-18119
Models of the hard X-ray spectrum of AM Herculis and implications for the accretion rate
[NASA-TM-86045] N84-18123
STELLAR SPECTROPHOTOMETRY
Time-varying speckle phenomena in astronomical imaging and in laser scattering N84-18118
Narrow-band photometry of faint red stars, 2
[BULL-191] N84-18126
STELLAR TEMPERATURE
Determination of individual temperatures and luminosities in eclipsing binary star systems
[AD-A134182] N84-18133
STEREOPHOTOGRAPHY
Remote sensing for geology N84-17668
STIFFNESS MATRIX
Matrix-free methods in the solution of stiff systems of ODE's
[DE84-003361] N84-17974
STIRLING CYCLE
Considerations on the external combustion system of the Stirling hot gas engine
[NASA-TM-77026] N84-17302
Automotive Stirling engine development program
[NASA-CR-168205] N84-18117
STOCHASTIC PROCESSES
Asynchronous discrete control of continuous processes
[AD-A135257] N84-17930
Algorithms, modeling and estimation for linear systems
[AD-A135134] N84-17951
Linear and nonlinear filtering and related inverse scattering problems
[AD-A135175] N84-17954
A stochastic network formulation for performance assessment and life-cycle modeling in complex system design
[AD-A135337] N84-17960
Estimation for infinite dimensional Ornstein-Uhlenbeck processes
[AD-A135372] N84-17961
Identification of a class of filtered Poisson processes
[AD-A134970] N84-17969
STOPPING
A stopping rule for a multi-person cooperative game
[TR-87] N84-17981
STOPPING POWER
Neon transport in selected organic composites --- stopping power of Kapton and polyethylene
[NASA-TM-85693] N84-18044
STORM DAMAGE
West breakwater-Sines (Portugal): Study of armor stability N84-17788
STORMS (METEOROLOGY)
West breakwater-Sines (Portugal): Wave climatology N84-17787
STRAIN HARDENING
An experimental and numerical investigation of pressure-shear waves in 6061-T6 aluminum and alpha-titanium N84-17345
STRAIN RATE
Earth strain measurements with the transportable laser ranging system: Field techniques and planning
[NASA-CR-175150] N84-17725
STRATIFIED FLOW
Baroclinic inertial instability in the non-static equilibrium atmosphere
[BLL-TRANS-1568-(9022.552)] N84-17751
STRATOSPHERE
A program of research in environmental modeling
[NASA-CR-173281] N84-17697
The retrieval of atmospheric constituent mixing-ratio profiles from solar absorption spectra
[NASA-CR-173303] N84-17730
STREAK PHOTOGRAPHY
Streak cameras for soft X-ray and optical radiation
[DE84-002780] N84-17564
STRESS ANALYSIS
Development of a modular battery
[BMFT-FB-W-83-021] N84-17504
Shock wave properties of anorthosite and gabbro
[NASA-CR-173309] N84-17521
A review of fracture mechanics life technology --- linear elastic fracture mechanics
[NASA-CR-170903] N84-17622
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773
STRESS CONCENTRATION
Stress-state index and Nadai-Lode parameter
[BLL-M-35433-(5828.4)] N84-17612
Some topics in finite elasticity N84-17614
STRESS CORROSION
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A135549] N84-17363
STRESS CORROSION CRACKING
Effects of nominal and crack-tip strain rate on IGSCC susceptibility in CERT tests
[DE84-004006] N84-17378
STRESS INTENSITY FACTORS
A cylindrical shell with a stress-free end which contains an axial part-through or through crack
[NASA-CR-173290] N84-17617
A pressurized cylindrical shell with a fixed end which contains an axial part-through or through crack
[NASA-CR-173291] N84-17618
A functional stress intensity approach to multiply cracked, partially autofrettaged cylinders
[AD-A135345] N84-17625
STRESS WAVES
Introduction to acoustic emission
[NASA-TM-77088] N84-18016
STRESS-STRAIN RELATIONSHIPS
Stress-state index and Nadai-Lode parameter
[BLL-M-35433-(5828.4)] N84-17612
Integrated evaluation of tensile strengths and ductility limits
[BLL-M-35452-(5828.4)] N84-17613

STRONGLY COUPLED PLASMAS
Fourier transform and polychromator studies of the inductively coupled plasma
[DE84-003975] N84-18059
STRUCTURAL ANALYSIS
Low concentration ratio solar array structural configuration N84-17225
Development of a thermal and structural model for a NASTRAN finite-element analysis of a hypersonic wing test structure
[NASA-CR-170413] N84-17620
Use of small crack data to bring about and quantify improvements to aircraft structural integrity
[AD-A135012] N84-17623
STRUCTURAL BASINS
Geophysical exploration surveys for ground water in the San Pedro Basin, Arizona
[PB84-110608] N84-17684
STRUCTURAL DESIGN
SAPIENS MEMO 5: The mechanical design of the EMP-simulator SAPIENS
[FOA-C-30320-A3] N84-17192
Study on large, ultralight long-life structures in space, phase 2C
[TM-EKR3] N84-17284
STRUCTURAL ENGINEERING
Use of small crack data to bring about and quantify improvements to aircraft structural integrity
[AD-A135012] N84-17623
STRUCTURAL PROPERTIES (GEOLOGY)
Geophysical exploration surveys for ground water in the San Pedro Basin, Arizona
[PB84-110608] N84-17684
STRUCTURAL STABILITY
West breakwater-Sines (Portugal): Study of armor stability N84-17788
SUBMERGED BODIES
Finite element method for incompressible laminar boundary layer flows N84-17126
SUBROUTINE LIBRARIES (COMPUTERS)
Software maintenance on FORTRAN libraries at a large computer installation
[DE84-002008] N84-17914
SUBSIDENCE
Subsidence monitoring for state of Arizona
[PB84-126960] N84-17750
SUBSTRATES
Metallic glass as a temperature sensor during ion plating
[NASA-TM-83566] N84-17351
Tribological characteristics of gold films deposited on metals by ion plating and vapor deposition
[NASA-TM-83572] N84-17352
SULFUR
Geological and geochemical controls on the chemical evolution of subsurface water in undisturbed and surface-mined landscapes in western North Dakota
[PB84-126952] N84-17685
SULFUR FLUORIDES
Dispersion experiments with sulfur hexafluoride from the 213m high meteorological mast at Cabauw in the Netherlands N84-17706
SULFUR OXIDES
Review of the National Ambient Air Quality Standards for sulfur oxides: Assessment of scientific and technical information
[PB84-102920] N84-17711
Air pollution effects on terrestrial ecosystems
[PB84-128313] N84-17712
SULFURIC ACID
Concentration of sulphuric acid: Premature failure of Bamag pots
[MRL-R-885] N84-17301
SUMMER
Light scattering condensation nuclei, and air mass trajectories at Whiteface Mountain: Summer 1982
[PB84-104363] N84-17742
SUN
Stability of the low degree 5 minute solar oscillations
[DE84-003786] N84-18143
Solar-geophysical data center number 467, July 1983, part 1 (prompt reports). Data for June 1983, May 1983 and late data
[PB84-100466] N84-18144
Solar-geophysical data number 467, July 1983, part 2 (comprehensive reports). Data for January 1983, November 1980 and miscellanea
[PB84-100494] N84-18145
SUNLIGHT
Ion measurements on GEOS using a negatively biased sensor on a positively charged spacecraft N84-17263
SUNRISE
A dawn to dusk electric field in the Jovian magnetosphere
[NASA-CR-166463] N84-18136
SUNSET
A dawn to dusk electric field in the Jovian magnetosphere
[NASA-CR-166463] N84-18136
SUPERCONDUCTING MAGNETS
Design, construction and test of a 0.61-meter-diameter, epoxy impregnated superconductive magnet
[AD-A135339] N84-18009
Ultra-high-field superconducting magnets
[DE84-003913] N84-18012
SUPERCONDUCTIVITY
Possibility of investigation of Kimerlite pipes by superconductive geomagnetic variation measuring stations
[CSIR-TRANS-1701] N84-17724
SUPERCONDUCTORS
Form coefficient for the field of a superconducting synchronous machine
[AD-A134751] N84-18010
Film synthesis and new superconductors
[AD-A135102] N84-18068
S-I-S mm-wave mixers and detectors
[AD-A134762] N84-18074
SUPERFLUIDITY
Using the surface tension to estimate the condensate density of superfluid He-4
[DE83-011325] N84-18077
SUPERHIGH FREQUENCIES
S-band SBAW microwave source, phase 2
[NASA-CR-175153] N84-17432
S-band range tracker and Surveillance Lab interface
[AD-A134730] N84-17451
Focusing the parabolic antenna
[NASA-CR-173304] N84-17642
SUPERLATTICES
Elementary excitations in semiconductor superlattices structures N84-18065
SUPERNOVAE
The time development of a blast wave with shock heated electrons
[NASA-CR-175364] N84-17529
SUPERSONIC COMBUSTION RAMJET ENGINES
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reaction flows
[NASA-CR-175365] N84-17520
SUPERSONIC DIFFUSERS
Variable area ejector-diffuser model tests
[AD-A134843] N84-17182
SUPERSONIC FLOW
Two-dimensional supersonic expansion flows on walls with nonequilibrium condensation N84-17125
Prediction of vortex shedding from circular and noncircular bodies in supersonic flow
[NASA-CR-3754] N84-17129
The COREL and W12SC3 computer programs for supersonic wing design and analysis
[NASA-CR-3676] N84-17130
Photodiagnostics of turbulent flows using laser-induced fluorescence
[NASA-CR-166546] N84-17519
Studies and vorticity effects by the Euler equations with emphasis on supersonic flow fields
[AD-A135118] N84-17535
SUPERSONIC SPEEDS
Aerodynamic characteristics of a Sparrow 3 missile model in the flow field of a generalized parent body at Mach 2.86
[NASA-TM-85713] N84-17134
SURFACE FINISHING
Study of the lubrication mechanism of thin film lubricated concentrated steel contacts. The influence of pre-treatment of the steel on the load carrying capacity
[AD-A135067] N84-17593
SURFACE IONIZATION
Impact ionization effects on Pioneer Venus Orbiter N84-17270
SURFACE PROPERTIES
Structural and electrochemical properties of platinum-titanium laser surface alloys N84-17346
Modification of alloy surface composition by segregation processes as a means of impurity control in fusion devices
[DE84-003645] N84-17373
Assessment of the potential of Langmuir-Blodgett films for room temperature IR (infrared) detectors
[AD-A134616] N84-17561
SURFACE REACTIONS
A photoacoustic study of chemically active systems
[AD-A134663] N84-17311
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358
Surface compatibility studies of potassium perchlorate reaction with pyrotechnic fuels
[DE84-002829] N84-17412
Potassium perchlorate reaction with pyrotechnic fuels
[DE84-002840] N84-17413
De-excitation and equipartition in H2-surface collisions
[DE84-003008] N84-18031
SURFACE ROUGHNESS
Aspects of the grinding process
[CSIR-TRANS-1694] N84-17416
A new derivation for the rough surface reflection coefficient and for the distribution of sea wave elevations
[AD-A134774] N84-17453
Numerical simulation of flow over rough surfaces, including effects of shock waves
[AD-A134700] N84-17545
Theoretical aspects of laser-induced periodic surface structure formation
[AD-A134875] N84-17581
SURFACE TEMPERATURE
Nitriding with a pulsed glow discharge
[BLL-OA-TRANS-3168-(6169.3)] N84-17335
Metallic glass as a temperature sensor during ion plating
[NASA-TM-83566] N84-17351
A determination of the constants for a second-order closure turbulence model from geophysical data
[AD-A134826] N84-17795
SURFACE WAVES
A new derivation for the rough surface reflection coefficient and for the distribution of sea wave elevations
[AD-A134774] N84-17453
Surface wave tomography
[NASA-CR-175373] N84-17728
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738
On modifications of the Zakharov equation for surface gravity waves
[AD-A135050] N84-17943
SURGES
Computer models for two-dimensional transient heat conduction
[AD-A134893] N84-17549
Transient thermal stresses in a reinforced hollow disk or cylinder containing a radial crack
[NASA-CR-173292] N84-17619
SURVEYS
Airborne fallout monitoring
[FOA-A-40045-A3] N84-17705
SWELLING
Improved swelling resistance for PCA austenitic stainless steel under HFIR irradiation through microstructural control
[DE84-003203] N84-17370
SWEPT FORWARD WINGS
Dynamics and control of forward swept wing aircraft
[NASA-CR-175369] N84-17172
SWEPT WINGS
Wind-tunnel free-flight investigation of a model of a forward-swept-wing fighter configuration
[NASA-TP-2230] N84-17184
SWITCHING CIRCUITS
Switched-capacitor sampled-data networks with communication applications N84-17429
SYMBOLIC PROGRAMMING
La Recherche Aerospatiale, bimonthly bulletin number 1983-2, 213/March-April
[ESA-TT-817] N84-18013
SYMMETRY
Preserving asymmetry by symmetric processes and distributed fair conflict resolution
[AD-A135458] N84-17986
SYNCHRONISM
Model mission study for laser synchronization of clocks
[SNIAS-221-CA/LP] N84-17569
Form coefficient for the field of a superconducting synchronous machine
[AD-A134751] N84-18010
SYNCHRONOUS SATELLITES
NOAA (National Oceanic and Atmospheric Administration) satellite programs briefing
[PB84-108349] N84-17781
SYNCHROTRONS
Proposed second harmonic acceleration system for the intense pulsed neutron source rapid cycling synchrotron
[DE84-003601] N84-18036
Preliminary tests of a second harmonic RF system for the intense pulsed neutron source synchrotron
[DE84-003595] N84-18041

SYNOPTIC METEOROLOGY
Synoptic meteorology during the SNOW-ONE-A field experiment
[AD-A134888] N84-17762
Status for knowledge: Meteorological affected icing on aircraft in clouds
[DFVLR-MITT-83-12] N84-17763
FGGE level 3-B daily global analyses. Part 2: (Mar. 1979 - May 1979)
[PB84-100270] N84-17780
SYNTAX
Processes and the denotational semantics of concurrency N84-17881
SYNTHESIS (CHEMISTRY)
The electrochemical behaviour of titanium platinum alloys in anodic oxidation processes. 1: Kinetics and selectivity of the process of the combined formation of O2, H2S2O8 and O3 on the titanium-platinum alloy
[BLL-OA-TRANS-3093-(6196.3)] N84-17336
Synthesis and characterization of binuclear Schiff base complexes of nickel, copper, and manganese
[AD-A135493] N84-17360
SYNTHETIC APERTURE RADAR
Flight test of a synthetic aperture radar antenna using STEP N84-17237
Multifrequency synthetic aperture radar antenna comparison study --- for remote sensing
[NASA-CR-171736] N84-17434
APQ-102 imaging radar digital image quality study
[NASA-CR-171738] N84-17435
Application of a feature selection technique to samples of high resolution synthetic aperture radar imagery
[AD-A135006] N84-17438
Workshop on active microwave sensor design N84-17667
SYNTHETIC FUELS
Alternative fuels for general aviation
[GPO-27-618] N84-17409
SYSTEM EFFECTIVENESS
Semiannual report to Congress on the effectiveness of the civil aviation security program
[AD-A134860] N84-17156
Aircrew training devices: Utility and utilization of advanced instructional features. Phase I: Tactical Air Command
[AD-A135052] N84-17190
SYSTEM FAILURES
Testability of interconnection structures
[AD-A135431] N84-17607
SYSTEM IDENTIFICATION
An on-line equivalent system identification scheme for adaptive control
[NASA-TM-85737] N84-17185
SYSTEMS ANALYSIS
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134854] N84-17155
STEP mechanical systems N84-17213
A stochastic network formulation for performance assessment and life-cycle modeling in complex system design
[AD-A135337] N84-17960
An approach to the design of a management information system: Development procedure for the Indonesian defense logistics staff
[AD-A134974] N84-18108
SYSTEMS COMPATIBILITY
Initial graphics exchange specification test library, version 1.3
[PB84-102144] N84-17922
SYSTEMS ENGINEERING
Workshop on active microwave sensor design N84-17667
Circular waveguide systems for electron-cyclotron-resonant heating of the tandem mirror experiment-upgrade
[DE84-003739] N84-18062
Automotive Stirling engine development program
[NASA-CR-168205] N84-18117
SYSTEMS INTEGRATION
STEP experiment integration N84-17215
SYSTEMS MANAGEMENT
Man and machine. The role of human factors in system development
[FOA-A-56005-H2] N84-17863
SYSTEMS SIMULATION
Correlative phase modulation for fixed satellite service-s. Volume 2: Supplementary report
[PTI-SB-2363-21-3794-VOL-2] N84-17466
Scatterometer System Simulator (SSS), phase 1: Definition --- ERS-1 (ESA satellite)
[ESA-CR(P)-1788] N84-17765
BERTHA: A versatile transmission line and circuit code
[AD-A135024] N84-17886
Selection of noisy sensors and actuators for regulation of linear systems --- large space structures
[AD-A135442] N84-17931
SYSTOLE
Assessment of the functional state of the heart muscle in aircrew members by means by bicycle ergometry N84-17815

T

TABLES (DATA)
Solar-geophysical data center number 467, July 1983, part 1 (prompt reports). Data for June 1983, May 1983 and late data
[PB84-100486] N84-18144
Solar-geophysical data number 467, July 1983, part 2 (comprehensive reports). Data for January 1983, November 1980 and miscellanea
[PB84-100494] N84-18145
TANTALUM ALLOYS
Influence of cobalt, tantaum and tungsten on the high temperature mechanical properties of single crystal nickel-base superalloys
[NASA-TM-83479] N84-17355
TARGET ACQUISITION
A multiple leg TMA (Target Motion Analysis) procedure with programs for the Hewlett-Packard HP-41CV, the Hewlett-Packard HP-75C, the sharp pC-1500 (TRS-80 pC and the Radio Shack TRS-80 model 100 portable computers
[AD-A134870] N84-17912
TARGET RECOGNITION
Preliminary field tests for detecting flying targets in front of a land background --- ground observers
[FOA-C-56033-H2] N84-17847
Detection of flying targets in front of a land background: Laboratory tests
[FOA-C-56034-H2] N84-17848
Detection of flying targets in front of a land background: Field tests --- human observers
[FOA-C-56035-H2] N84-17849
TASKS
Task conditions versus stable individual differences as determinants of experts' judgement policies
[AD-A134797] N84-17841
Task differences, stylistic characteristics and physiological arousal
[AD-A134335] N84-17844
Effects of load, cognitive complexity and type A on satisfaction
[AD-A134415] N84-17848
TECHNOLOGICAL FORECASTING
Effects on rail transport caused by air transport supply alternatives within the Federal Republic of Germany for the year 2000
[DFVLR-MITT-83-14] N84-17160
Developments in cabin safety and crashworthiness --- passenger aircraft N84-17161
TECHNOLOGIES
Scientific and technical information system for the Washington State Legislature
[PB84-100650] N84-18112
TECHNOLOGY ASSESSMENT
Fusion reactors: Physics and technology
[DE83-017148] N84-18055
TECHNOLOGY TRANSFER
National Bureau of Standards Journal of Research, volume 88, no. 4, July - August 1983
[PB84-115849] N84-17571
Joint industry/university cooperation with federally supported research facilities
[GPO-24-902] N84-18115
TECHNOLOGY UTILIZATION
Further delineation of the utilization of scientific literature by U.S. patents
[PB84-100734] N84-18095
TECTONICS
Lithological characterization of crystalline basement rock provinces of the interior of the United States
[NASA-CR-175180] N84-17727
TELECOMMUNICATION
Synopsis and recommendations of the TSC Workshop on differential operation of NAVSTAR GPS, June 1983
[PB84-121599] N84-17170
Estimating the performance of telecommunication systems using the ionospheric transmission channel. Ionospheric communications analysis and prediction program user's manual
[PB84-111210] N84-17468
Research Laboratory of Electronics
[AD-A135319] N84-17488
Adaptive feedforward linear wideband HF power bank
[AD-A134744] N84-17493
Meeting the automatic data processing and telecommunications needs of the federal government: A five-year plan
[PB83-195255] N84-18111
TELECONFERENCING
Coding of full motion color video signals at 50 kb/s
[AD-A134319] N84-17456
TELEMETRY
Study of a pulse width modulated, telemetered, microprocessor based data acquisition system N84-17247
TELEVISION SYSTEMS
An airborne programmable digital to video converter
[AD-A134839] N84-17181
Analysis of technical possibilities for further sharing of the UHF television band by the land mobile services in the top ten land mobile markets
[PB84-123116] N84-17470
TELEVISION TRANSMISSION
Digital sound service for direct broadcasting satellites N84-17462
TEMPERATURE CONTROL
Thermal energy management process experiment N84-17222
TEMPERATURE DEPENDENCE
Dependence of thermoluminescence output on temperature during irradiation for several thermoluminescence phosphors
[AD-A134940] N84-17313
Temperature aspects of pulsed ion bombardment in an austenitic alloy
[DE84-003382] N84-17376
TEMPERATURE EFFECTS
Tempering kinetics of alloy steels as a function of quench rate and M sub s temperature
[AD-A134806] N84-17365
Transient thermal stresses in a reinforced hollow disk or cylinder containing a radial crack
[NASA-CR-173292] N84-17619
TEMPERATURE MEASUREMENT
Photodiagnostics of turbulent flows using laser-induced fluorescence
[NASA-CR-166546] N84-17519
TERR, PERR, and GIGC: Three programs to compute verification statistics
[PB84-127521] N84-17775
Hydrographic station data of five surveys of the beta-triangle in the eastern North Atlantic, 1978 - 1981
[PB84-100874] N84-17800
TEMPERATURE MEASURING INSTRUMENTS
Hot-wire measurements of velocity and temperature fluctuations in a heated turbulent boundary layer
[AD-A135212] N84-17538
TEMPERATURE SENSORS
Metallic glass as a temperature sensor during ion plating
[NASA-TM-83566] N84-17351
TEMPERING
Tempering kinetics of alloy steels as a function of quench rate and M sub s temperature
[AD-A134806] N84-17365
TENSILE DEFORMATION
Stress-state index and Nadai-Lode parameter
[BLL-M-35433-(5828.4)] N84-17612
Nonlinear geometric, material and time dependent analysis of reinforced concrete shells with edge beams
[PB84-104454] N84-17639
TENSILE PROPERTIES
A study of polymer matrix fatigue properties
[AD-A135076] N84-17294
Effects of JP-4 fuel on Graphite/Epoxy composites
[AD-A135416] N84-17296
Correlation of fracture toughness with tensile properties for irradiated 20% cold-worked 316 stainless steel
[DE84-003954] N84-17379
Over-aging of aluminum alloys
[DE84-004927] N84-17382
Mechanical and transport properties of rocks at high temperatures and pressures. Task 3. Mechanical properties of rocks at high temperatures and pressures
[DE84-003438] N84-17740
TENSILE STRENGTH
Crack propagation in polystyrene under fixed elongation
[AD-A134749] N84-17399
Integrated evaluation of tensile strengths and ductility limits
[BLL-M-35452-(5828.4)] N84-17613
A study on the tensile strength of ice as a function of grain size
[AD-A134889] N84-17631
Concrete tensile strength study
[PB84-101021] N84-17637

TERNARY SYSTEMS
Study of intermetallic compounds in ternary systems Al-Ba-Nd and Al-Ba-Yb
[BLL-M-35367-(5828.4)] N84-17343
Thermal conductivity of ternary and quaternary III-V compounds
[AD-A135336] N84-18070
Characterization of high temperature electrically conducting oxides
[DE84-002887] N84-18076

TERRAIN
Application of a feature selection technique to samples of high resolution synthetic aperture radar imagery
[AD-A135006] N84-17438

TEST FACILITIES
Project DELUGE: The development of a Holloman high speed test track heavy rainfield
[AD-A134810] N84-17205
Development of power system measurements
[PB84-109891] N84-17509

TESTS
Primality testing N84-17993

TETHERED SATELLITES
Investigation of electrodynamic stabilization and control of long orbiting tethers
[NASA-CR-170972] N84-17251
Electrodynamic interactions between a tethered satellite system and the ionosphere N84-17279

THEMATIC MAPPING
Typical SPOT data and products: Potential applications N84-17653
Typical remote sensing data products N84-17656
Land use inventory and statistical sampling in agriculture — spaceborne remote sensing N84-17658

THEOREM PROVING
Abstract automath
[MATH-CENTRE-TRACTS-160] N84-17938
Tests for preference
[MATH-CENTRE-TRACTS-162] N84-17939

THEORIES
Design and complexity of VLSI algorithms N84-17876

THERAPY
Military Medical Journal, no. 3, 1983
[L-2399] N84-17817

THERMAL CONDUCTIVITY
Thermal conductivity of ternary and quaternary III-V compounds
[AD-A135336] N84-18070
Spectroscopy of thermal energy transport
[AD-A134670] N84-18073

THERMAL CYCLING TESTS
Preliminary study of thermomechanical fatigue of polycrystalline MAR-M 200
[NASA-TP-2280] N84-17350

THERMAL DEGRADATION
Aging degradation of cast stainless steel: Status and program
[DE84-004018] N84-17381
An investigation of the thermodegradation of ablative organic silicon resin
[AD-A135546] N84-17397
Mass spectrometric decomposition studies on several azido and nitrato polymers, thermal plasticizers and novel nitramines
[AD-A134636] N84-17398

THERMAL DIFFUSIVITY
Sensitivity and accuracy analysis of pulse diffusivity measurements on layered samples
[DE84-002104] N84-17584

THERMAL ENERGY
Thermal-energy transport from arc to rails in an arc-driven rail gun
[AD-A134991] N84-17499

THERMAL EXPANSION
Comparison of the characteristics of graphites irradiated at 600 and 9000 deg C
[DE83-015695] N84-17297
Method of high-temperature expansions in short-range order theory
[BLL-M-35385-(5828.4)] N84-17344

THERMAL FATIGUE
Preliminary study of thermomechanical fatigue of polycrystalline MAR-M 200
[NASA-TP-2280] N84-17350

THERMAL MAPPING
Comparison of the information content of data from the LANDSAT 4 Thematic Mapper and the multispectral scanner
[E84-10081] N84-17641

THERMAL PLASMAS
Comparison of thermal plasma observations on SCATHA and GEOS N84-17262
Ion measurements on GEOS using a negatively biased sensor on a positively charged spacecraft N84-17263
A potential control method for thermal plasma measurements on the DE-1 spacecraft N84-17276

THERMAL PROTECTION
In-flight load testing of advanced shuttle thermal protection systems
[NASA-TM-86024] N84-17250
Protection against heat radiation in the steel industry — protective visor
[FOA-C-20500-E4] N84-17864

THERMAL RADIATION
Infrared heating
[BLL-OA-TRANS-3121-(6196.3)] N84-17512

THERMAL STABILITY
Dressing methods for grinding wheels made of superhard abrasive materials
[CSIR-TRANS-1700] N84-17419

THERMAL STRESSES
Transient thermal stresses in a reinforced hollow disk or cylinder containing a radial crack
[NASA-CR-173292] N84-17619
Biochemical indicators of thermal stress: Selected genetic and physiological parameters
[PB84-100122] N84-17808

THERMITES
Surface compatibility studies of potassium perchlorate reaction with pyrotechnic fuels
[DE84-002829] N84-17412
Potassium perchlorate reaction with pyrotechnic fuels
[DE84-002840] N84-17413

THERMODYNAMIC PROPERTIES
Considerations on the external combustion system of the Stirling hot gas engine
[NASA-TM-77026] N84-17302
Molten salt electrochemical systems
[AD-A135108] N84-17304
NBS (National Bureau of Standards): Materials measurements — space processing experiments
[NASA-CR-173162] N84-17384

THERMODYNAMICS
Entropy production during fatigue as a criterion for failure. The critical entropy threshold: A mathematical model for fatigue
[AD-A134767] N84-17628

THERMOELECTRIC MATERIALS
Refractory materials for high-temperature thermoelectric energy conversion
[NASA-CR-173159] N84-17388

THERMOLUMINESCENCE
Dependence of thermoluminescence output on temperature during irradiation for several thermoluminescence phosphors
[AD-A134940] N84-17313

THERMOPHYSICAL PROPERTIES
Hydrogen sulfide provisional thermophysical properties from 188 to 700 K at pressures to 75 MPa
[PB84-122704] N84-17329

THERMOPLASTIC RESINS
An investigation of the thermodegradation of ablative organic silicon resin
[AD-A135546] N84-17397

THERMOREGULATION
Autonomic influences on peripheral circulatory and thermal responses to cold
[AD-A134444] N84-17831

THERMOSPHERE
A new model of the geomagnetic variation in the upper atmosphere
[AD-A135210] N84-17733

THICK WALLS
A functional stress intensity approach to multiply cracked, partially autofrettaged cylinders
[AD-A135345] N84-17625

THICKNESS
Eddy current thickness gauge for reel-to-reel tape processes
[DE84-004050] N84-17567

THIN BODIES
Multi-transition stamping of components with thin body and tall stiffening ribs
[BLL-M-35384-(5828.4)] N84-17415

THIN FILMS
Deposition of polymer films on metal by the electrolysis of aqueous solutions of vinyl monomers
[BLL-LTS-1200/83-(5828.4F)] N84-17386
The ball bearing as a rheological test device
[NASA-TM-83570] N84-17591
A study of nucleation and growth of thin films by means of computer simulation: General features
[NASA-TM-83559] N84-17982
Film synthesis and new superconductors
[AD-A135102] N84-18068

THIOLS
Cyclic voltammetry of polysulfide (Thiokol) prepolymers and related compounds
[MRL-R-911] N84-17387

THREE DIMENSIONAL BOUNDARY LAYER
Three-dimensional turbulent boundary layer on a body of revolution at incidence
[AD-A135454] N84-17539

THREE DIMENSIONAL FLOW
Programs for calculating quasi-three-dimensional flow in a turbomachine blade row
[NASA-TM-83588] N84-17138

THUNDERSTORMS
Data acquisition for evaluation of an airborne lightning detection system
[AD-A135318] N84-17153

THYRATRONS
Inexpensive solid-state trigger unit for thyratrons
[DE84-001424] N84-17501

THYRISTORS
Optimization of the parameters of the arc suppressing system of high-voltage apparatuses with a thyristor attachment
[BLL-OA-TRANS-3139-(6196.3)] N84-17476

TIME
An algebraic approach to analysis and control of time-scales
[AD-A135115] N84-17949

TIME DEPENDENCE
Probabilistic planning and budgeting for R and D programs involving activities of high uncertainty
[DE84-002310] N84-18093

TIME DIVISION MULTIPLE ACCESS
Traffic routing in a switched regenerative satellite. Volume 1, task 3: Traffic assignment
[ESA-CR(P)-1792-VOL-1] N84-17463
Traffic routing in a switched regenerative satellite. Volume 2, task 4: Review (executive summary)
[ESA-CR(P)-1792-VOL-2] N84-17464

TIME SERIES ANALYSIS
Asymptotic properties of extended Yule-Walker estimates of the AR parameters of an ARMA (autoregressive moving-average)
[AD-A134981] N84-17970

TIME SHARING
Objective measure of pilot workload
[NASA-CR-173296] N84-17858

TIME SIGNALS
Nyquist frequency
[AD-A135023] N84-17440

TIMING DEVICES
Improvements to high speed rotating prism cameras including on board timing and event pulse generators
[MRL-TN-476] N84-17557

TIRES
Dynamic behavior of nonuniform tire/wheel assemblies
[PB84-125541] N84-17598

TITANIUM
Electrodeposition method
[BLL-OA-TRANS-3134-(6196.3)] N84-17337
Process and cell arrangement for producing difficult to reduce elements by fused salt electrolysis
[BLL-OA-TRANS-3137-(6196.3)] N84-17339
An experimental and numerical investigation of pressure-shear waves in 6061-T6 aluminum and alpha-titanium N84-17345
Structural and electrochemical properties of platinum-titanium laser surface alloys N84-17346

TITANIUM ALLOYS
The electrochemical behaviour of titanium platinum alloys in anodic oxidation processes. 1: Kinetics and selectivity of the process of the combined formation of O2, H2S2O8 and O3 on the titanium-platinum alloy
[BLL-OA-TRANS-3093-(6196.3)] N84-17336
Production of titanium powders by the electrolysis of chloride-fluoride melts with a soluble anode
[BLL-OA-TRANS-3136-(6196.3)] N84-17338
An evaluation of overload retardation behavior and overload retardation models of Ti-6Al-4V sheet titanium alloy
[AD-A135548] N84-17362

TITANIUM BORIDES
Sensitivity and accuracy analysis of pulse diffusivity measurements on layered samples
[DE84-002104] N84-17584

TITANIUM CARBIDES
Sensitivity and accuracy analysis of pulse diffusivity measurements on layered samples
[DE84-002104] N84-17584

TITANIUM NITRIDES
Adhesion studies on ion plated TiN steel
[BLL-RISLEY-TR-4880-(9091.9F)] N84-17341

TITANIUM OXIDES
Characterization of high temperature electrically conducting oxides
[DE84-002887] N84-18076

TOBACCO
The effect of smoking on the non-specific resistance of the organism of seamen at sea N84-17816

TOKAMAK DEVICES
Research on modeling of FED/INTOR radio-frequency heating and studies of FED/INTOR impurity-control mechanisms
[DE83-016756] N84-18056
TOLERANCES (PHYSIOLOGY)
Rationale for a Threshold Limit Value (TLV)R for JP-4/Jet B wide cut aviation turbine fuel
[AD-A134814] N84-17827
TOMOGRAPHY
Surface wave tomography
[NASA-CR-175373] N84-17728
Maximum likelihood reconstruction in emission tomography with time-of-flight information: A limited study
[AD-A135061] N84-17944
TOPOGRAPHY
Aspects of the grinding process
[CSIR-TRANS-1694] N84-17416
Application of hierarchical data structures to geographical information systems
[AD-A134999] N84-17670
Empirical analysis of meandering and flow characteristics in laboratory and natural channels
[DE84-003461] N84-17679
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738
Statistical aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea
[AD-A134428] N84-17798
TOPOLOGY
RADC (Rome Air Development Center) DDP (Distributed Data Processing) topology evaluation
[AD-A134701] N84-17909
TOROIDAL PLASMAS
Precisely aligned internal magnetic probes for the reversed-field pinch experiment, ZT-40
[DE84-003704] N84-18058
TORSIONAL VIBRATION
Determination of the viscoelastic shear modulus using forced torsional vibrations
[PB84-119700] N84-17638
TOUGHNESS
Correlation of fracture toughness with tensile properties for irradiated 20% cold-worked 316 stainless steel
[DE84-003954] N84-17379
TOXIC HAZARDS
Reactivity of TNT and TNA-microbial reduction products with soil components
[AD-A135512] N84-17698
Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707
TOXICITY
Rabbit neurobehavioral toxicity from aluminum
[PB84-103266] N84-17809
Rationale for a Threshold Limit Value (TLV)R for JP-4/Jet B wide cut aviation turbine fuel
[AD-A134814] N84-17827
TRACE CONTAMINANTS
Dispersion experiments with sulfur hexafluoride from the 213m high meteorological mast at Cabauw in the Netherlands N84-17706
TRACKS
Project DELUGE: The development of a Holloman high speed test track heavy rainfield
[AD-A134810] N84-17205
TRAFFIC CONTROL
Traffic routing in a switched regenerative satellite. Volume 1, task 3: Traffic assignment
[ESA-CR(P)-1792-VOL-1] N84-17463
Traffic routing in a switched regenerative satellite. Volume 2, task 4: Review (executive summary)
[ESA-CR(P)-1792-VOL-2] N84-17464
TRAILING EDGES
Trailing edge flow conditions as a factor in airfoil design
[NASA-CR-173294] N84-17140
Calculating C-grids with fine and embedded mesh regions
[CFDL-TR-83-7] N84-18090
TRAINING AIRCRAFT
Analysis of the pilot conversion process for the Air Force T-46A jet trainer aircraft
[AD-A134404] N84-17845
TRAINING DEVICES
Aircrew training devices: Utility and utilization of advanced instructional features. Phase I: Tactical Air Command
[AD-A135052] N84-17190
A reliability and failure mode analysis of celestial training device microcomputers employed by SAC and MAC
[AD-A135003] N84-17885
TRANSFER ORBITS
Study of Attitude Control and Guidance System (ACGS) for orbit change stage
[ESA-CR(P)-1797] N84-17285
TRANSFORMATIONS (MATHEMATICS)
Hierarchical cache accumulators for sequential mode estimation
[AD-A134698] N84-17908
Convergence of quadratic forms in p-stable random variables and theta sub p-radonifying operators
[AD-A135314] N84-17959
TRANSIENT RESPONSE
Effects of different rub models on simulated rotor dynamics
[NASA-TP-2220] N84-17590
TRANSISTORS
The 25 kW resonant dc/dc power converter
[NASA-CR-168273] N84-17481
TRANSITION
Crossed molecular beam studies of the reactions of oxygen and fluorine atoms
[AD-A135415] N84-17309
TRANSITION FLOW
Flow technical problems with transitions between partial and complete filling and with flow measurement in channel sections. --- sewage flow
[TUM-SFB-81] N84-17552
TRANSITION PRESSURE
Multi-transition stamping of components with thin body and tall stiffening ribs
[BLL-M-35384-(5828.4)] N84-17415
TRANSMISSION EFFICIENCY
User manual of the CATSS system (version 1.0) communication analysis tool for space station
[NASA-CR-171728] N84-17431
TRANSMISSION LINES
Transmission line transformers; theory and design data
[FOA-C-30327-E] N84-17503
Preliminary investigation of an electrical network model for ultrasonic scattering
[NASA-CR-3770] N84-17606
BERTHA: A versatile transmission line and circuit code
[AD-A135024] N84-17886
TRANSMISSION LOSS
A computer program for solving the parabolic equation using an implicit finite-difference solution method and incorporating exact interface conditions
[AD-A135325] N84-17903
TRANSMISSOMETERS
Evaluation of visibility sensors at the Eglin Air Force Base climatic chamber
[AD-A135375] N84-17758
TRANSMITTERS
The 20 GHz spacecraft FET solid state transmitter
[NASA-CR-168240] N84-17477
TRANSONIC FLIGHT
Wave drag as the objective function in transonic fighter wing optimization
[NASA-TP-2265] N84-17127
TRANSONIC FLOW
Investigation of flow phenomena in a transonic fan rotor using laser anemometry
[NASA-TM-83555] N84-17143
TWINTN4: A program for transonic four-wall interference assessment in two-dimensional wind tunnels
[NASA-CR-3777] N84-17189
Automatic adaptive grid refinement for the Euler equations
[NASA-CR-173161] N84-17977
La Recherche Aerospatiale bimonthly bulletin, number 1983-3, 214/May-June
[ESA-TT-822] N84-18014
TRANSONIC WIND TUNNELS
Tests on a CAST 7 two-dimensional airfoil in a streamlining test section
[NASA-CR-172291] N84-17136
Evaluation of turbulence induced noise in coherent anti-Stokes Raman scattering
[NASA-CR-166544] N84-18015
TRANSPORT PROPERTIES
Electrode noise in beta aluminas
[AD-A134837] N84-17497
Estimation of North America anthropogenic sulfur deposition as a function of source/receptor separation
[DE84-003638] N84-17701
High field transport of free carriers at the Si-SiO2 interface
[AD-A135338] N84-18071
Electron ballistic effects in III-V semiconductors
[AD-A135353] N84-18072
Spectroscopy of thermal energy transport
[AD-A134670] N84-18073
TRANSPORT THEORY
Mass and momentum turbulent transport experiments with confined swirling coaxial jets
[NASA-CR-168252] N84-17530
Estimation of temporally and spatially varying coefficients in models for insect dispersal
[AD-A135093] N84-17946
TRANSVERSE ACCELERATION
Auroral ion acceleration
[PR-783] N84-17715
TREES (MATHEMATICS)
Partially ordered computations with applications to VLSI design N84-17880
TRIBOLOGY
Tribological characteristics of gold films deposited on metals by ion plating and vapor deposition
[NASA-TM-83572] N84-17352
TRIGGER CIRCUITS
Inexpensive solid-state trigger unit for thyratrons
[DE84-001424] N84-17501
TRINITROTOLUENE
Reactivity of TNT and TNA-microbial reduction products with soil components
[AD-A135512] N84-17698
TROPICAL REGIONS
Test of the use of LANDSAT imagery to detect changes in the area of forest in the tropics
[DE84-004444] N84-17680
Effect of the microclimate on the night sleep and physical fitness of seamen during a cruise in the low latitudes N84-17813
TROPOSPHERE
A statistical-dynamical study of the large-scale intraseasonal variability of the northern hemisphere winter circulation N84-17716
TRUSSES
Development of Test Article Building Block (TABB) for deployable platform systems N84-17226
TUNGSTEN
Influence of vibration grinding on the properties of tungsten powders and the quality of sintered pieces
[BLL-M-35373] N84-17414
TUNGSTEN ALLOYS
Influence of cobalt, tantalum and tungsten on the high temperature mechanical properties of single crystal nickel-base superalloys
[NASA-TM-83479] N84-17355
Modification of alloy surface composition by segregation processes as a means of impurity control in fusion devices
[DE84-003645] N84-17373
TUNGSTEN CARBIDES
Wheel efficiency in the diamond-spark erosion grinding of tungsten carbides
[CSIR-TRANS-1693] N84-17418
TUNNELS
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635
TURBINE BLADES
Flexible conformable clamps for a machining cell with applications to turbine blade machining
[AD-A134942] N84-17596
TURBINE PUMPS
SSME structural dynamic model development
[NASA-CR-170960] N84-17287
TURBINE WHEELS
Ceramic components for gas turbines, phase 2
[BMFT-FB-T-83-198] N84-17183
TURBOFAN ENGINES
Hot-flow tests of a series of 10-percent-scale turbofan forced mixing nozzles
[NASA-TP-2268] N84-17525
TURBOGENERATORS
The effects of blade mounted vortex generators on the noise from a MOD-2 wind turbine generator
[NASA-CR-172292] N84-18017
TURBOMACHINE BLADES
Programs for calculating quasi-three-dimensional flow in a turbomachine blade row
[NASA-TM-83588] N84-17138
TURBULENCE
Time-varying speckle phenomena in astronomical imaging and in laser scattering N84-18118
Turbulence and mass motion in galactic molecular clouds N84-18129
TURBULENCE EFFECTS
Evaluation of turbulence induced noise in coherent anti-Stokes Raman scattering
[NASA-CR-166544] N84-18015
TURBULENT BOUNDARY LAYER
Hot-wire measurements of velocity and temperature fluctuations in a heated turbulent boundary layer
[AD-A135212] N84-17538

Three-dimensional turbulent boundary layer on a body of revolution at incidence
[AD-A135454] N84-17539
Doppler lidar signal and turbulence study
[NASA-CR-170978] N84-17574
A determination of the constants for a second-order closure turbulence model from geophysical data
[AD-A134826] N84-17795

TURBULENT FLOW
Numerical study of a separating and reattaching flow by using Reynolds-stress tubulence closure
[NASA-CR-166547] N84-17133
Finite analytic numerical solutions of laminar and turbulent convective heat transfer for pipe flow past a cavity N84-17515
Photodiagnostics of turbulent flows using laser-induced fluorescence
[NASA-CR-166546] N84-17519
Improved turbulence models based on large eddy simulation of homogeneous, incompressible turbulent flows
[NASA-CR-166541] N84-17526
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 1: Two-dimensional laser Doppler anemometer studies of isothermal flowfield in a ducted centerbody combustor
[AD-A134691] N84-17542
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 2: Numerical predictions of isothermal flowfields in a ducted centerbody combustor
[AD-A134692] N84-17543
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolves Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
Understanding transition to turbulence in shear layers
[AD-A134796] N84-17548
Turbulence measurements in plane jets and plumes in crossflow
[PB84-105303] N84-17554

TURBULENT JETS
Prediction of an apparent flame length in a co-axial jet diffusion flame combustor
[AD-A135088] N84-17303
Experimental investigation of the turbulent axisymmetric jet N84-17518
Mass and momentum turbulent transport experiments with confined swirling coaxial jets
[NASA-CR-168252] N84-17530

TWO BODY PROBLEM
Research in theoretical nuclear physics
[DE84-003442] N84-18038

TWO DIMENSIONAL FLOW
TWINTN4: A program for transonic four-wall interference assessment in two-dimensional wind tunnels
[NASA-CR-3777] N84-17189
The effect of the artificial far field boundary on a finite different approximation of the Navier-Stokes equations for a compressible fluid
[AD-A135152] N84-17536

TWO PHASE FLOW
Experimental study of bubble cavities attached to a rotating shaft in a reservoir
[NASA-TM-83586] N84-17533

U

U.S.S.R.
Military Medical Journal, no. 7, 1983
[L-2456] N84-17811

UH-1 HELICOPTER
Documentation of ice shapes on the main rotor of a UH-1H helicopter in hover
[NASA-CR-168332] N84-17139
Experimental blade vortex interaction noise characteristics of a utility helicopter at 1/4 scale
[NASA-TM-84653] N84-18018

ULCERS
The response of rats to cutaneous dosing with trichothecene mycotoxins
[MRL-R-902] N84-17803

ULTRAHIGH FREQUENCIES
S-band SBAW microwave source, phase 2
[NASA-CR-175153] N84-17432
S-band range tracker and Surveillance Lab interface
[AD-A134730] N84-17451
Analysis of technical possibilities for further sharing of the UHF television band by the land mobile services in the top ten land mobile markets
[PB84-123116] N84-17470

ULTRALOW TEMPERATURES
Specific heat of He-3 in the Fermi-liquid region
[DE83-014858] N84-17566

ULTRASONIC RADIATION
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738

ULTRASONIC SCANNERS
Quality assurance of heat-fused polyethylene plastic pipe joints, phase 2
[PB84-104942] N84-17608
Torsional ultrasonic technique for reactor vessel liquid level measurement
[DE84-003357] N84-18024

ULTRASONIC TESTS
Equation of state of fluid NH-3 from P-V-T and ultrasound measurements to 12 kbar
[DE83-015913] N84-17316
Blood flow measurements under high-G conditions: Early prediction of Gz tolerance
[AD-A134653] N84-17823

ULTRAVIOLET ASTRONOMY
ROSAT-FI design review
[MPE-39] N84-17209

ULTRAVIOLET RADIATION
NIMBUS-7 SBUV (Solar Backscatter Ultraviolet) observations of solar UV spectal irradiance variations caused by solar rotation and active-region evolution for the period November 7, 1978 - October 26, 1979
[PB84-108166] N84-17743
Combined ultraviolet studies of astronomical sources
[NASA-CR-175377] N84-18121

ULTRAVIOLET SPECTROMETERS
Stellar Ultraviolet Rocket Research Program — faint object spectrograph
[NASA-CR-175361] N84-18119

UNDERWATER ACOUSTICS
Wave propagation study of the central Mediterranean Sea using ocean bottom seismometers
[AD-A135484] N84-17790
A computer program for solving the parabolic equation using an implicit finite-difference solution method and incorporating exact interface conditions
[AD-A135325] N84-17903
Linear time-variant space-variant filters and the WKB approximation
[AD-A134886] N84-18021

UNDERWATER COMMUNICATION
Advanced filter technology
[AD-A135446] N84-18050

UNDERWATER EXPLOSIONS
Large amplitude waves generated by an explosive mechanism
[MRL-R-905] N84-17524

UNDERWATER STRUCTURES
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635

UNIVERSITIES
Joint industry/university cooperation with federally supported research facilities
[GPO-24-902] N84-18115

UNMANNED SPACECRAFT
An investigation of non-extravehicular activity (Non-EVA) on-orbit maintenance support concepts for orbiting systems
[AD-A134957] N84-17199

URBAN PLANNING
Geography information systems project
[INPE-2782-PRE/348] N84-18100

URINE
Standard research materials: Feces and urine N84-17854

USER MANUALS (COMPUTER PROGRAMS)
User manual of the CATSS system (version 1.0) communication analysis tool for space station
[NASA-CR-171728] N84-17431
Estimating the performance of telecommunication systems using the ionospheric transmission channel. Ionospheric communications analysis and prediction program user's manual
[PB84-111210] N84-17468
TIGS (table plot interactive graphics system)--an interactive graphical system for the creation and correction of tabular data sets
[AD-A135522] N84-17906
A multiple leg TMA (Target Motion Analysis) procedure with programs for the Hewlett-Packard HP-41CV, the Hewlett-Packard HP-75C, the sharp pC-1500 (TRS-80 pC and the Radio Shack TRS-80 model 100 portable computers
[AD-A134870] N84-17912
Standard methods for image processing. Part 4: Operating instructions for the program system
[BMVG-FBWT-83-1] N84-17915

USER REQUIREMENTS
Look at techniques for the dimensional calibration of standard microscopic particles
[PB84-112648] N84-17324

V

VACUUM CHAMBERS
Laboratory measurement of impact ionization N84-17271

VACUUM SYSTEMS
Vacuum ionic carburisation
[BLL-OA-TRANS-3149-(6196.3)] N84-17291

VALENCE
Applications of solvent extraction in hydrometallurgy
[BLL-OA-TRANS-3162-(6196.3)] N84-17334

VALUE ENGINEERING
Mini-Seminar on Quality Assurance
[CSIR-TSD-0008/82] N84-17600

VAN DER WAAL FORCES
Deterministic chaos in materials exhibiting phase transitions
[AD-A135172] N84-17537

VANADIUM ALLOYS
Constitution diagram of system vanadium - copper
[AD-A135516] N84-17361
Modification of alloy surface composition by segregation processes as a means of impurity control in fusion devices
[DE84-003645] N84-17373

VAPOR DEPOSITION
Ceramic components for gas turbines, phase 2
[BMFT-FB-T-83-198] N84-17183
Eddy current thickness gauge for reel-to-reel tape processes
[DE84-004050] N84-17567
InGaPAs by metalorganic chemical vapor deposition
[AD-A135281] N84-18069

VAPOR PHASE EPITAXY
Film synthesis and new superconductors
[AD-A135102] N84-18068

VAPOR PHASES
Comparison of photon stimulated dissociation of gas phase, solid and chemisorbed water
[AD-A134986] N84-17314

VAPOR PRESSURE
Meteorological applications library (CRH.LB)
[PB84-122639] N84-17776

VARIATIONS
Ocean research for understanding climatic variations: Priorities and goals for the 1980's
[PB84-105816] N84-17768

VAX-11/780 COMPUTER
Standard methods for image processing. Part 4: Operating instructions for the program system
[BMVG-FBWT-83-1] N84-17915

VEGETATION
Remote sensing for agriculture and land use N84-17666

VELOCITY DISTRIBUTION
Incident velocity distributions on sampling electrodes of spacecraft plasma instruments N84-17267
Similar velocity profiles and integral quantities of a boundary layer on a rotating cylinder
[VKI-NT-148] N84-17553
Velocity and electronic state distributions of sputtered Fe atoms by laser-induced fluorescence spectroscopy
[DE84-003649] N84-18040

VELOCITY MEASUREMENT
Rules governing the distribution of a gas jet in a liquid. Communication 2
[BLL-M-35437-(5828.4)] N84-17513
Teleseismic array analysis of upper mantle compressional velocity structure
[NASA-CR-173285] N84-17723
Blood flow measurements under high-G conditions: Early prediction of Gz tolerance
[AD-A134653] N84-17823

VENUS ATMOSPHERE
Proposals for VIRA (Venus International Reference Atmosphere): Chemical composition of atmosphere below 100 km
[PR-830] N84-18134
Proposals for VIRA (Venus International Reference Atmosphere): Solar and thermal radiation
[PR-829] N84-18135
Morphology and movements of polarization features on Venus
[NASA-CR-166464] N84-18137

VENUS CLOUDS
Morphology and movements of polarization features on Venus
[NASA-CR-166464] N84-18137

VERTICAL DISTRIBUTION
Frequency and mode shape calculations for vertical axis wind turbines using reduction techniques and complex eigensolvers
[DE84-003316] N84-17633
VERTICAL ORIENTATION
Wind speed and direction shears with associated vertical motion during strong surface winds
[NASA-TM-82566] N84-17756
VERY HIGH FREQUENCIES
Comparative antenna measurements in real environment: Steerable null antenna at 30 - 76 MHz
[FOA-C-30303-E2] N84-17459
Silent radar: A study of the performances of a navigational radar with limited range
[FOA-C-30334-E1] N84-17461
VERY LARGE SCALE INTEGRATION
VLSI research
[AD-A134628] N84-17491
Research in VLSI systems. Heuristic programming project and VLSI theory project. A fast turn around facility for very large scale integration (VLSI)
[AD-A134809] N84-17494
Foundations of computer science 4. Distributed systems. Part 1: Algorithms and complexity
[MATH-CENTRE-TRACTS-158-PT-1] N84-17873
Design and complexity of VLSI algorithms N84-17876
Systolic computation and VLSI N84-17877
VLSI, algorithms and graphics N84-17878
Foundations of computer science 4. Distributed systems. Part 2: Semantics and logic
[MATH-CENTRE-TRACTS-159-PT-2] N84-17879
Partially ordered computations with applications to VLSI design N84-17880
Statistical data processing, system modeling and reliability
[AD-A135208] N84-17984
VERY LONG BASE INTERFEROMETRY
The importance of radio interferometry for geodynamics N84-17644
VIBRATION
Influence of vibration grinding on the properties of tungsten powders and the quality of sintered pieces
[BLL-M-35373] N84-17414
Rubidium frequency standard study
[AD-A134713] N84-17492
Flexible conformable clamps for a machining cell with applications to turbine blade machining
[AD-A134942] N84-17596
Frequency and mode shape calculations for vertical axis wind turbines using reduction techniques and complex eigensolvers
[DE84-003316] N84-17633
VIBRATION DAMPING
The effects of the space environment on damping materials and damping designs on flexible structures N84-17217
Vibration isolation technology experiment N84-17228
Investigation of articulated panel dynamics N84-17230
Squeeze-film damping of rotor-dynamic systems N84-17610
Control theory of hyperbolic systems
[AD-A135146] N84-17952
VIBRATION EFFECTS
The Shock and Vibration Digest, volume 15, no. 9
[AD-A134750] N84-17609
VIBRATION ISOLATORS
Vibration isolation technology experiment N84-17228
The Shock and Vibration Digest, volume 15, no. 9
[AD-A134750] N84-17609
Squeeze-film damping of rotor-dynamic systems N84-17610
VIDEO COMMUNICATION
Coding of full motion color video signals at 50 kb/s
[AD-A134319] N84-17456
VIDEO EQUIPMENT
Development of an autonomous video rendezvous and docking system, phase 3
[NASA-CR-170969] N84-17249
Terminal work in the process industry: Experience in a time perspective. Part 2: A few years after the installation -- computer terminal operators
[FOA-C-56039-H2-PT-2] N84-17422
VIRTUAL MEMORY SYSTEMS
Empirical studies of program behaviour in virtual memory
[PB84-112267] N84-17921
VISCOELASTICITY
Fracture and contact problems for linearly viscoelastic material
[AD-A135111] N84-17624
Determination of the viscoelastic shear modulus using forced torsional vibrations
[PB84-119700] N84-17638
VISCOSITY
Fundamentals of non-Newtonian liquid flow on surfaces
[AD-A135543] N84-17541
VISCOUS DAMPING
Determination of the viscoelastic shear modulus using forced torsional vibrations
[PB84-119700] N84-17638
VISCOUS FLOW
Comparison of secondary flows predicted by a viscous code and an inviscid code with experimental data for a turning duct
[NASA-TM-83575] N84-17142
Stability of the laminar boundary layer in a streamwise corner
[NASA-CR-173282] N84-17532
VISIBILITY
Effects of diesel vehicles on visibility in California
[PB84-122167] N84-17714
Evaluation of visibility sensors at the Eglin Air Force Base climatic chamber
[AD-A135375] N84-17758
VISIBLE SPECTRUM
ERG (Electroretinogram) implicit time: An exploration of high frequency wavelets recorded in the human visual system
[AD-A134575] N84-17832
VISION
The 1980 and 1981 accident experience of civil airmen with selected visual pathology
[AD-A134898] N84-17158
ERG (Electroretinogram) implicit time: An exploration of high frequency wavelets recorded in the human visual system
[AD-A134575] N84-17832
VISORS
Protection against heat radiation in the steel industry -- protective visor
[FOA-C-20500-E4] N84-17864
VISUAL CONTROL
Results of a slant range visibility field test in Munich-Reim
[DFVLR-MITT-83-09] N84-17169
VISUAL SIGNALS
Quantification of interference and detectability properties of visual stimuli for optimal display design
[AD-A135438] N84-18049
VISUAL STIMULI
Temporal aspects of eye movement when viewing multiple targets
[AD-A134853] N84-17828
VOICE COMMUNICATION
Human factors issues associated with the use of speech technology in the cockpit
[NASA-CR-166548] N84-17433
Jam-resistant speech encoding
[AD-A134707] N84-17448
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1
[AD-A135232] N84-17485
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2
[AD-A135233] N84-17486
VOICE DATA PROCESSING
Simply instrumentable and optimal digitization of analog information sources
[AD-A135124] N84-17484
VOIDS
Improved swelling resistance for PCA austenitic stainless steel under HFIR irradiation through microstructural control
[DE84-003203] N84-17370
VOLTAGE CONTROLLED OSCILLATORS
Rubidium frequency standard study
[AD-A134713] N84-17492
VOLTAGE CONVERTERS (DC TO DC)
The 25 kW resonant dc/dc power converter
[NASA-CR-168273] N84-17481
VOLTMETERS
AC voltage calibrations for the 0.1 Hz to 10 Hz frequency range
[PB84-109867] N84-17570
VORTEX GENERATORS
The effects of blade mounted vortex generators on the noise from a MOD-2 wind turbine generator
[NASA-CR-172292] N84-18017
Hot wire in low Reynolds number flow N84-18087
VORTEX RINGS
Computation of potential flows with embedded vortex rings and applications to helicopter rotor wakes
[NASA-CR-166542] N84-17526
VORTEX SHEDDING
Prediction of vortex shedding from circular and noncircular bodies in supersonic flow
[NASA-CR-3754] N84-17129
A cooperative program to stimulate student involvement through the MIT Undergraduate Research Opportunity Program
[NASA-CR-173300] N84-18086
Hot wire in low Reynolds number flow N84-18087
VORTICES
Three-dimensional turbulent boundary layer on a body of revolution at incidence
[AD-A135454] N84-17539
Experimental blade vortex interaction noise characteristics of a utility helicopter at 1/4 scale
[NASA-TM-84653] N84-18018
VOYAGER 1 SPACECRAFT
Charging effects observed on Voyager 1 near Jupiter N84-17260

W

WAFERS
The use of diamond core saws in the electronics industry
[CSIR-TRANS-1702] N84-17417
WAKES
Contributions to satellite sheath and wake modeling N84-17266
Three-dimensional turbulent boundary layer on a body of revolution at incidence
[AD-A135454] N84-17539
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 1: Two-dimensional laser Doppler anemometer studies of isothermal flowfield in a ducted centerbody combustor
[AD-A134691] N84-17542
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 2: Numerical predictions of isothermal flowfields in a ducted centerbody combustor
[AD-A134692] N84-17543
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolved Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
WARFARE
Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707
WASTE UTILIZATION
Hydrolysis of plastic wastes with the aim of recovering and reprocessing the starting components (recycling)
[BMFT-FB-T-83-199] N84-17322
WASTE WATER
Pilot system for the purification of rinse water and for the recuperation of metals in electroplating companies. Pilot system metal recovery from waste water (RMA)
[BMFT-FB-T-83-206] N84-17323
WATER
Comparison of photon stimulated dissociation of gas phase, solid and chemisorbed water
[AD-A134986] N84-17314
Thermophysical properties of gaseous carbon dioxide/water mixtures
[PB84-125228] N84-17330
Heat pump units with electrically driven compressors for water heating
[BLL-OA-TRANS-3181-(6196.3)] N84-17514
WATER CURRENTS
Chemical and biological processes in CO/sub 2-ocean models
[DE84-003304] N84-17702
WATER DEPTH
Methodology for the calculation of a shallow-water wave climate
[AD-A134715] N84-17792
On modifications of the Zakharov equation for surface gravity waves
[AD-A135050] N84-17943
WATER FLOW
Torsional ultrasonic technique for reactor vessel liquid level measurement
[DE84-003357] N84-18024
WATER HEATING
Heat pump units with electrically driven compressors for water heating
[BLL-OA-TRANS-3181-(6196.3)] N84-17514
WATER IMMERSION
Water immersion and its computer simulation as analogs of weightlessness
[NASA-CR-171746] N84-17821

WATER POLLUTION
Remote sensing: New satellite systems and potential applications — conferences
[ESA-SP-205] N84-17650
The remote sensing of oil pollution at sea: An attempt at synthesis N84-17662
Environmental Radiation Data Report 33, January - March 1983
[PB84-104785] N84-17708

WATER VAPOR
Dual channel water vapor radiometer system
[PB84-119445] N84-17746

WATER WAVES
Sea state monitoring and applications N84-17665
West breakwater-Sines (Portugal): Wave climatology N84-17787
Wave propagation study of the central Mediterranean Sea using ocean bottom seismometers
[AD-A135484] N84-17790
Nearshore current model workshop summary
[AD-A134702] N84-17791
Methodology for the calculation of a shallow-water wave climate
[AD-A134715] N84-17792
Solitary waves in water colliding head-on
[AD-A135537] N84-17964

WAVE AMPLIFICATION
Strong motion effects due to seismic waves in dipping layers
[PB84-127919] N84-17747

WAVE ATTENUATION
Attenuation of millimeter waves on Earth-space paths by rain clouds
[PB84-115120] N84-17471
Wave propagation study of the central Mediterranean Sea using ocean bottom seismometers
[AD-A135484] N84-17790

WAVE DIFFRACTION
Interaction of weak shock waves and discrete gas inhomogeneities N84-17517
Strong motion effects due to seismic waves in dipping layers
[PB84-127919] N84-17747

WAVE DRAG
Wave drag as the objective function in transonic fighter wing optimization
[NASA-TP-2265] N84-17127

WAVE EQUATIONS
Nonlinear mode coupling theory of the lower-hybrid-drift instability
[AD-A135538] N84-17734
Control theory of hyperbolic systems
[AD-A135146] N84-17952
Smoothness of bounded solutions of nonlinear evolution equations
[AD-A135294] N84-17958
A comparison of explicit time integration techniques for the finite element shock wave equations
[AD-A134757] N84-17968
A study of waves on a curved space-time N84-18083

WAVE FUNCTIONS
Contributions to the theory of quantum 1/f noise N84-18082

WAVE INTERACTION
On modifications of the Zakharov equation for surface gravity waves
[AD-A135050] N84-17943
S-I-S mm-wave mixers and detectors
[AD-A134762] N84-18074

WAVE PROPAGATION
On the propagation laws of combustion waves in solids (pyrotechnic reactions)
[BLL-TRANS-1098-(7291.7965)] N84-17300
A new derivation for the rough surface reflection coefficient and for the distribution of sea wave elevations
[AD-A134774] N84-17453
A diagnostic probe to investigate propagation at millimeter wavelengths
[PB84-104223] N84-17473
Electron acceleration in the front of intense collisionless shock waves
[PR-813] N84-17511
Large amplitude waves generated by an explosive mechanism
[MRL-R-905] N84-17524
Report from the URSI Commission F Symposium on Wave Propagation and Remote Sensing
[FOA-C-30340-E2] N84-17682
Evaluation of turbulence induced noise in coherent anti-Stokes Raman scattering
[NASA-CR-166544] N84-18015
Interaction of electromagnetic fields with plasma
[AD-A135173] N84-18054

WAVE REFLECTION
Interaction of weak shock waves and discrete gas inhomogeneities N84-17517

WAVE SCATTERING
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738
Maximum entropy reconstruction of a volume anomaly from pulse scatter data
[DE84-002463] N84-18084

WAVEFORMS
A catalogue of spreading modulation spectra
[AD-A134850] N84-17454

WAVEGUIDES
Multifrequency synthetic aperture radar antenna comparison study — for remote sensing
[NASA-CR-171736] N84-17434
Circular waveguide systems for electron-cyclotron-resonant heating of the tandem mirror experiment-upgrade
[DE84-003739] N84-18062

WEAK ENERGY INTERACTIONS
Low energy neutrino physics
[DE84-002656] N84-18037

WEAPON SYSTEMS
Achievement of electromagnetic compatibility in weapon systems — ships N84-17430

WEAR
Friction and wear behavior of aluminum and composite airplane skins
[NASA-TP-2262] N84-17175
Tribological characteristics of gold films deposited on metals by ion plating and vapor deposition
[NASA-TM-83572] N84-17352
Friction and wear reduction of 440C stainless steel by ion implantation
[DE84-003255] N84-17371
Aspects of the grinding process
[CSIR-TRANS-1694] N84-17416

WEATHER FORECASTING
Cloud forecast fields comparison test
[AD-A135556] N84-17761
Mariners weather log, volume 27, number 3, summer 1983
[PB84-106356] N84-17771
A statistical technique for forecasting severe weather from vertical soundings by satellite and radiosonde
[PB84-114099] N84-17772
FGGE level 3-B daily global analyses. Part 2: (Mar. 1979 - May 1979)
[PB84-100270] N84-17780
NOAA (National Oceanic and Atmospheric Administration) satellite programs briefing
[PB84-108349] N84-17781

WEIGHT (MASS)
Report of the 68th National Conference on Weights and Measures 1983
[PB84-110998] N84-17425

WEIGHT MEASUREMENT
Report of the 68th National Conference on Weights and Measures 1983
[PB84-110998] N84-17425
Specifications, tolerances, and other technical requirements for weighing and measuring devices
[PB84-125764] N84-17572

WEIGHT REDUCTION
Energy balance and the composition of weight loss during prolonged space flight
[NASA-CR-171745] N84-17820

WEIGHTING FUNCTIONS
Specifications, tolerances, and other technical requirements for weighing and measuring devices
[PB84-125764] N84-17572

WEIGHTLESSNESS
High capacity heat pipe performance demonstration
[NASA-CR-171733] N84-17531
Water immersion and its computer simulation as analogs of weightlessness
[NASA-CR-171746] N84-17821

WENTZEL-KRAMER-BRILLOUIN METHOD
Linear time-variant space-variant filters and the WKB approximation
[AD-A134886] N84-18021

WEST GERMANY
The Prandtl Hergesell project of a National Research Establishment for Aeronautics
[DFVLR-MITT-83-10] N84-17123

WHEELS
Dynamic behavior of nonuniform tire/wheel assemblies
[PB84-125541] N84-17598

WHITE DWARF STARS
Models of the hard X-ray spectrum of AM Herculis and implications for the accretion rate
[NASA-TM-86045] N84-18123

WHITE NOISE
Noise
[AD-A135066] N84-17983

WIND (METEOROLOGY)
Photon-burst correlation techniques for atmospheric crosswind measurements
[AD-A134817] N84-17735

WIND DIRECTION
Flight measurement and analysis of AAFE RADSCAT wind speed signature of the ocean
[NASA-TM-85646] N84-17784

WIND EFFECTS
Nearshore current model workshop summary
[AD-A134702] N84-17791

WIND MEASUREMENT
The first European Remote Sensing Satellite (ERS-1): Overall description, potential applications and users N84-17654
Scatterometer System Simulator (SSS), phase 1: Definition — ERS-1 (ESA satellite)
[ESA-CR(P)-1788] N84-17765
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773

WIND SHEAR
Wind speed and direction shears with associated vertical motion during strong surface winds
[NASA-TM-82566] N84-17756
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773

WIND TUNNEL STABILITY TESTS
La Recherche Aerospatiale bimonthly bulletin, number 1983-3, 214/May-June
[ESA-TT-822] N84-18014

WIND TUNNEL TESTS
Tests on a CAST 7 two-dimensional airfoil in a streamlining test section
[NASA-CR-172291] N84-17136
IRAAM wind tunnel test, task 3
[AD-A135256] N84-17148
Airloads research study. Volume 2: Airload coefficients derived from wind tunnel data
[NASA-CR-10410] N84-17174
Wind-tunnel free-flight investigation of a model of a forward-swept-wing fighter configuration
[NASA-TP-2230] N84-17184

WIND TUNNEL WALLS
Tests on a CAST 7 two-dimensional airfoil in a streamlining test section
[NASA-CR-172291] N84-17136
A cooperative program to stimulate student involvement through the MIT Undergraduate Research Opportunity Program
[NASA-CR-173300] N84-18086
Adaptation of two-dimensional transonic analysis code, TSFOIL, for use in modeling adaptive wall test sections N84-18089

WIND TUNNELS
Correlations of supersonic boundary-layer transition on cones including effects of large axial variations in wind-tunnel noise
[NASA-TP-2229] N84-17534
Experimental blade vortex interaction noise characteristics of a utility helicopter at 1/4 scale
[NASA-TM-84653] N84-18018
Hot wire in low Reynolds number flow N84-18087
Flow behavior in the Wright Brothers Facility
[WBWT-TR-1187] N84-18088

WIND TURBINES
Frequency and mode shape calculations for vertical axis wind turbines using reduction techniques and complex eigensolvers
[DE84-003316] N84-17633
The effects of blade mounted vortex generators on the noise from a MOD-2 wind turbine generator
[NASA-CR-172292] N84-18017

WIND VELOCITY
A study of the dependence of radar backscatter cross section on wind speed and wave slope from the MARSEN experimental results (a contribution to studies of radar backscattering from the sea surface). Supplement to final report
[AD-A135041] N84-17441
Wind speed and direction shears with associated vertical motion during strong surface winds
[NASA-TM-82566] N84-17756
Flight measurement and analysis of AAFE RADSCAT wind speed signature of the ocean
[NASA-TM-85646] N84-17784
Sea salt aerosol, atmospheric radon and meteorological observations in the western South Atlantic Ocean (February 1981)
[AD-A134792] N84-17794

WIND VELOCITY MEASUREMENT
Doppler lidar signal and turbulence study
[NASA-CR-170976] N84-17574
Workshop on active microwave sensor design N84-17667

WINDING
A mathematical model for the doubly-fed wound rotor generator, part 2
[NASA-TM-83581] N84-17479

WINDSHIELDS
Ion deposited carbon coatings
[AD-A135068] N84-17390

WING TIP VORTICES
Helicopter rotor wake geometry and its influence in forward flight. Volume 1: Generalized wake geometry and wake effect on rotor airloads and performance
[NASA-CR-3726] N84-17149

WINGS
Development of a thermal and structural model for a NASTRAN finite-element analysis of a hypersonic wing test structure
[NASA-CR-170413] N84-17620

WINTER
A statistical-dynamical study of the large-scale intraseasonal variability of the northern hemisphere winter circulation N84-17716

WIRE
A technique for the nondestructive detection of voids and composition anomalies in metal matrix composite wires using X or gamma rays
[AD-A135481] N84-17359

WORK CAPACITY
The concept of working capacity of the flight crew N84-17837

WORKLOADS (PSYCHOPHYSIOLOGY)
Effects of load, cognitive complexity and type A on satisfaction
[AD-A134415] N84-17846
Objective measure of pilot workload
[NASA-CR-173296] N84-17858
A theoretical approach to measuring pilot workload
[NASA-CR-173297] N84-17859

WOUND HEALING
Formation and remodeling of the early wound matrix
[AD-A134576] N84-17833

X

X RAY ASTRONOMY
ROSAT-FI design review
[MPE-39] N84-17209

X RAY DIFFRACTION
Model compound studies of rigid rod aromatic heterocyclic polymer systems, the X-ray crystal structure of 2,6-diphenylbenzo (1,2-d; 5,4-d') diimidazole tetrahydrate, C2OH14N4. 4H2O, a model system for the study of polymer-water interaction in polybenzimidazoles
[AD-A135278] N84-17393

X RAY IRRADIATION
Streak cameras for soft X-ray and optical radiation
[DE84-002780] N84-17564

X RAY SCATTERING
RLE (Research Laboratory of Electronics)
[AD-A134812] N84-17495

X RAY SOURCES
High resolution X- and gamma-ray spectroscopy of cosmic X-ray sources
[NASA-CR-175368] N84-18148

X RAY SPECTRA
Models of the hard X-ray spectrum of AM Herculis and implications for the accretion rate
[NASA-TM-86045] N84-18123
High resolution X- and gamma-ray spectroscopy of cosmic X-ray sources
[NASA-CR-175368] N84-18148

X RAYS
Limits on diffuse X-ray emission from M101
[NASA-CR-173277] N84-18147

Y

YIELD STRENGTH
Environmental factors as a source of failure in integrated circuits N84-17604

YTTERBIUM COMPOUNDS
Study of intermetallic compounds in ternary systems Al-Ba-Nd and Al-Ba-Yb
[BLL-M-35387-(5828.4)] N84-17343

Z

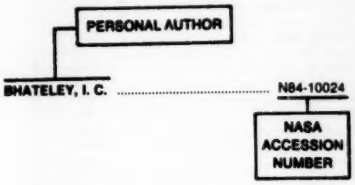
ZINC
Segregation of Zn solutes to high-angles (001) twist grain boundaries in Al
[DE84-003455] N84-17375

ZINC COATINGS
Pilot system for the purification of rinse water and for the recuperation of metals in electroplating companies. Pilot system metal recovery from waste water (RMA)
[BMFT-FB-T-83-208] N84-17323

ZIRCONIUM OXIDES
Optimum dimensions of solid zirconium dioxide-base electrolyte in transducer of activity meter N84-18064

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ABERNATHY, R. H. N84-17411
ABORN, R. A. N84-17199
ABRAMS, B. S. N84-17493
ABROMAVAGE, M. M. N84-17445
ACHENBACH, J. D. N84-17630
ADAMS, D. F. N84-17294
ADAMS, L. M. N84-17899
ADAMS, W. W. N94-17393
ADONEV, N. M. N64-17476
AGGSON, T. L. N84-17255
AGTERBERG, R. N84-17706
AHMED, S. N84-17237
AHRENS, T. J. N84-17369
N84-17521
AIKEN, R. C. N84-17956
AISENBERG, S. N84-17390
ALANKO, T. O. N84-17921
ALBERT, M. R. N84-17549
ALDRIDGE, K. D. N84-17546
ALEKSEENKO, L. S. N84-18064
ALEXANDER, J. B. N84-18126
ALEXANDER, M. B. N84-17756
ALEXANDER, P. M. N84-17452
ALFANO, A. J. N84-17810
ALLAGNON, B. N84-17282
ALLCOCK, H. R. N84-17396
ALLEGRE, J. N84-17290
ALLEN, J. N84-17487
N84-17488
N84-17495
ALLEN, J. H. N84-18144
N84-18145
ALLEN, J. L., JR. N84-17218
ALLEN, K. C. N84-17471
N84-17473
AMANO, R. S. N84-17133
AMATA, E. N84-17264
AMAZEEN, C. A. N84-17933
AMER, S. N84-17334
ANDERSON, D. L. N84-17728
ANDERSON, G. E. N84-17835
ANDERSON, H. U. N84-18076
ANDERSON, N. L. N84-17807
ANDERSON, W. R. N84-17579
ANDERSSON, J. O. N84-17707
ANDREAS, E. L. N84-17736
ANDREWS, D. C. N84-17493
ANDREWS, R. J. N84-17542
ANGEL, C. N84-17745
ANJAR, B. N84-17461
ANSELL, G. S. N84-17293
N84-17365
N84-17366
ANSELONE, P. M. N84-18008
ANTONELLI, M. N84-18117
APERS, P. M. G. N84-18101
APPLETON, B. R. N84-17403
APT, K. R. N84-17882
ARENDS, H. N84-17271
ARENDS, M. N84-17145
ARMSTRONG, E. S. N84-17947
ARNOLD, D. N84-17251
ARORA, A. A. N84-17485
N84-17486
ASP, B. N84-17459
ATKINSON, B. N84-17914
AVERYANOV, V. V. N84-18053
AVILOV, I. A. N84-17804
AYRAULT, G. N84-17381

B

BACHMAIER, C. N84-17243
BACHSTEIN, F. N84-17169
BAECHER, G. B. N84-17801
BAER, E. N84-17399
BAES, C. F., JR. N84-17702
BAGHERIAN, A. B. N84-17436
BAHR, C. C. N84-18080
BAIK, J. M. N84-17347
BAKER, C. R. N84-17455
BAKER, R. R. N84-17400
BALDWIN, D. N84-17778
BALEBANOV, V. M. N84-17208
BALIUNAS, S. L. N84-18121
BAME, S. J. N84-17720
BANKOV, L. N84-17208
BANKS, H. T. N84-17945
N84-17946
N84-17947
BARBERIS, G. N84-17464
BARBOUR, R. T. N84-17226
BARBROW, L. E. N84-17425
BARD, J. P. N84-17282
BARDINO, J. N84-17528
BARKER, R. J. N84-18028
BARLOW, R. E. N84-17987
BARNES, P. W. N84-17798
BARNETT, A. N84-17260
BARON, V. V. N84-17361
BARR, E. E. N84-17493
BARTLETT, M. D. N84-17173
N84-17174
BARTON, J. J. N84-18080
BARTON, S. A. N84-17308
BATES, J. J. N84-17240
BATTEN, J. J. N84-17301
BAUDET, G. M. N84-17876
BAUER, O. H. N84-17261
BAUER, S. J. N84-17740
BAUMGARDNER, J. N84-17731
BEBERMEIER, H. N84-17694
BECKER, R. J. N84-17544
BECKER, R. L. N84-18033
N84-18035
BECKWITH, I. E. N84-17534
BEDFORD, A. J. N84-17482
BEERI, C. N84-17887
BEGELINGER, A. N84-17593
BEHRINGER, D. W. N84-17800
BELKHOUCHE, B. N84-17896
BELL, C. B. N84-17942
BELOV, B. T. N84-17513
BELOV, I. V. N84-17513
BEN-BASSAT, M. N84-17932
BENNER, C. L. N84-17401
BENNETT, J. C. N84-17538
BENNETT, K. B. N84-18019
BENSEMA, W. D. N84-17510
BERGER, M. J. N84-17977
BERGQUIST, A. N84-17503
BERGQUIST, P. R. N84-17394
BERI, A. C. N84-17581
BERLIN, I. K. N84-18053
BERNARD, M. L. N84-17300
BERNASCONI, M. C. N84-17284
BERNSTEIN, A. J. N84-17927
BERNSTEIN, I. N84-17583
BERS, L. N84-17948
BERSHADER, D. N84-17519
BERTINOV, A. I. N84-18010
BESUNER, P. M. N84-17615
N84-17622
BEVENSEE, R. M. N84-18084
BEYER, R. A. N84-17579
BIDASARIA, H. B. N84-18044
BILELLO, M. A. N84-17762
BILL, R. C. N84-17350
BILLINGS, D. S. N84-17826
BIRD, A. A. N84-17795
BIRDSEYE, E. H. N84-17177
BIRKS, A. R. N84-17683
BISHOP, E. C. N84-17827
BLAAUWENDRAAD, J. N84-17635
BLAIR, M. F. N84-17538
BLAIR, W. P. N84-18121
BLENSKI, G. N84-17646
BLEVINS, B. A. N84-17434
BOCHEV, A. N84-17208
BODECHTEL, J. N84-17657
BODHAINE, B. A. N84-17742
BODROV, V. A. N84-17837
BOHAN, W. A. N84-17240
BOLANDER, G. N84-17586
BONDARENKO, S. I. N84-17724
BOOZE, C. F., JR. N84-17158
BORISENKOV, Y. P. N84-17752
BORISOVA, T. I. N84-17336
BOROVIKOV, V. S. N84-17613
BORTNOVSKIY, V. N. N84-17816
BORZOV, G. G. N84-18011
BOSAMYKIN, V. S. N84-18029
BOSLOUGH, M. B. N84-17521
BOTHUN, G. D. N84-18121
BOWLING, W. C. N84-17412
N84-17413
BOWMAN, C. T. N84-17317
BOYD, J. K. N84-18057
BRACE, L. H. N84-17270
BRACKEN, R. E. N84-17749
BRADLEY, O. H., JR. N84-17213
BRADOW, F. V. N84-17712
BRADY, F. J. N84-17479
BRANDEBERRY, F. N84-18036
N84-18041
BRASKI, D. N. N84-17370
BRAUN, M. J. N84-17533
BRENNECKE, J. N84-17681
BRENNER, A. C. N84-17683
BRENT, R. P. N84-18006
BRENTJES, A. J. N84-18003
BRESSAN, D. J. N84-17794
BREWE, D. E. N84-17592
BRISENFELDT, R. N84-17705
BRITT, C. L. N84-17178
BROCAIL, B. N84-17262
BRODERSEN, R. W. N84-17491
BROFMAN, P. J. N84-17366
BRON, W. E. N84-18073
BROPHY, J. J. N84-17497
BROSSIER, C. N84-17683
BROWN, C. M. N84-17908
BROWN, H. N84-17494
BROWN, P. N. N84-17974
BROWN, R. M. N84-17453
BROWNER, R. F. N84-17852
BRUMFIELD, M. L. N84-17211
BRYUKHOVETSKIY, A. G. N84-17815
BUCHAN, G. M. N84-17867
BUCKLEY, D. H. N84-17351
N84-17352
BUNDY, T. R. N84-17907
BUNTING, R. K. N84-17304
BUONTEMPO, M. E. N84-18125
BURKE, K. A. N84-17856
BURKE, W. R. N84-17650
BURKHARDT, L. C. N84-18058
BURLAGA, L. F. N84-18131
N84-18149
BURNHAM, D. C. N84-17758
BURYLEV, B. P. N84-17343
BUSCH, J. R. N84-18047
BUSH, B. D. N84-17451
BYER, R. L. N84-18066

C

CABUK, J. G., JR. N84-17121
CADDY, M. J. N84-17906
CADY, D. R. N84-18146
CAHILL, T. N84-17725
CALAWAY, W. F. N84-18040
CALDERON, M. O. N84-18062
CAMBANIS, S. N84-17959
CAMP, D. W. N84-17756
CAMPBELL, J. N84-17644
CAMPBELL, L. J. N84-18077
CAMPBELL, R. M. N84-18133
CAMPBELL, T. G. N84-17232
CAMPBELL, W. H. N84-17760
CAMPBELL, W. J. N84-17737
CANDIDI, M. N84-17264
CAPP, S. P. N84-17518
CARDEN, J. L. N84-17852
CARMACK, L. N84-17822
CARPENTER, M. P. N84-18095
N84-18096
CARREIRO, L. N84-17357
CASSADY, M. N84-17608
CAULFIELD, H. J. N84-18047
CAVERLY, J. C. N84-17400
CERNI, T. A. N84-17770
CHAN, E. C. N84-17639
CHANDY, K. M. N84-17904
N84-17986
N84-18105
CHANG, K. N84-17480
CHAPELL, C. R. N84-17277
CHAPKANOV, S. N84-17208
CHAPMAN, G. T. N84-17141
CHAPPELL, C. R. N84-17276
CHARQIN, A. K. N84-18062
CHATTERJEE, S. N84-17790
CHAVEZ, P. F. N84-17973
CHAVEZ, R. J. N84-17933
CHELYSHEV, N. A. N84-17612
CHEN, F. J. N84-17534
CHEN, P. J. N84-17500
CHEO, B. R. N84-18054
CHERNIN, D. N84-18030
CHERRY, S. J. N84-17872
CHERVOV, G. A. N84-17612
CHI, M. T. H. N84-17840
CHINITZ, W. N84-17520
CHOPRA, O. K. N84-17381
CHRISTENSEN, T. R. N84-17568
CHRISTOPH, G. H. N84-17545
CHRISTOSKOV, L. N84-17744
CHU, C. K. N84-17941
CHUDNOVSKY, A. N84-17399
CHUDNOVSKY, D. V. N84-17948
CHUDNOVSKY, G. V. N84-17948
CIUNDZIEWICKI, T. N84-18107
CLARK, G. A. N84-17482
CLIFFORD, L. D. N84-17683
COCHRAN, H. S. N84-17543
COFFEY, H. E. N84-18144
N84-18145
COFFIELD, F. E. N84-17566
N84-18062
COFFMAN, J. L. N84-17745
COHEN, H. A. N84-17275
COHEN, R. B. N84-17411
COLE, M. N84-17901
COLEMAN, P. R. N84-17678
COLLINS, R. E. N84-17822
COLLINS, W. N84-17869
COLLIS, W. J. N84-18070
COLOMBO, G. N84-17251
COMPERE, A. L. N84-17597
CONN, R. W. N84-18055
N84-18056
CONNER, D. A. N84-18018
COOLEY, W. L. N84-17869
COOPER, A. P. B. N84-17683
COOPER, W. A. N84-17770
CORNISH, D. H. N84-18012
CORWIN, W. R. N84-17377
COSTILLO, R. C. N84-17742
COUCH, R. H. N84-17214
COUTSIAS, E. A. N84-18027
COVERT, E. E. N84-18087
COWAN, A. M. N84-17683
COX, A. N. N84-18143
COX, D. P. N84-17529
COX, S. K. N84-17755
CRACKNELL, A. P. N84-17663
CRAEMER, W. N84-17285
CRAMPTON, S. B. N84-17582
CRAWLEY, A. B. N84-17636
CRAWLEY, E. F. N84-17221
CREEL, T. R., JR. N84-17534
CROCKETT, T. W. N84-17899
CRONE, H. D. N84-17803
CROOKE, M. N84-17604
CRUZ, J. B., JR. N84-17179
CRUZ, M. A. C. N84-17898
CURRIER, J. H. N84-17631
CUTKOSKY, M. R. N84-17595

D

DACHEV, Z. N84-17208
DAHLAUSEN, M. J. N84-17857
DAMOS, D. N84-17433
DANGELO, N. N84-17265
DANIEL, I. M. N84-17558
DANIEL, P. L. N84-17945
N84-17947
DANSET, P. T. N84-17544
DARMON, C. A. N84-17241
DASHCUND, D. N84-17148
DATTAGUPTA, S. N84-18078
DAVIDSON, H. L. N84-17565
DAVIS, C. M. N84-17178
DAVIS, J. M. N84-17712
DAVIS, L. S. N84-18106
DAVIS, S. H. N84-17522
N84-17541
DEBAKKER, J. W. N84-17873
N84-17879
N84-17881
DEBLASIO, R. N84-17688
DEBONI, T. M. N84-18031
DEBRUCQ, D. N84-17969
DECREAU, P. N84-17256
N84-17262
DEJONGH, J. N84-17145
DEJONGHE, L. C. N84-18079
DELAGRANGE, A. D. N84-17498
DELALE, C. F. N84-17125
DELORENZO, M. L. N84-17931
DELUISI, J. J. N84-17742
DENBAUM, C. A. P. N84-17895
DEOLIVEIRA, J. L. N84-18100
DESMARAIS, L. A. N84-17157
DESTEIGUER, D. N84-17830
DETREVILLE, R. T. P. N84-17827
DEVOOGT, W. J. P. N84-17787
DEWAAL, D. J. N84-17981
DEWALD, A. B. N84-17373
DEWILDE, M. A. N84-17579
DEWITT, R. J. N84-17551
DIEBOLD, G. J. N84-18023
DIK, J. J. N84-17939
DILLE, J. R. N84-17158
DISKIN, G. N84-17520
DIXON, S. C. N84-17135
DOBKIN, D. P. N84-17878
DOBROWOLNY, M. N84-17279
DOERBECK, F. H. N84-17483
DOGAN, M. N84-17610
DOISNEAU, R. G. N84-17298
DOLPH, C. L. N84-17955
DONATELLI, D. E. N84-17281
DONNELLY, R. F. N84-17743
DORMAN, H. J. N84-17725
DOSS, S. N84-17585
DOUGHERTY, H. T. N84-17467
DOVGAYA, G. P. N84-17338
DOWELL, E. H. N84-17146
DOWLING, R. P., II N84-17394
DRAKE, J. F. N84-17734
DRAVINSKI, M. N84-17747
DRAWBAUGH, R. B. N84-17827
DRESS, W. B. N84-18024
DUBININ, E. M. N84-17208
DUBOIS, D. N84-17909
DUCHOSSOIS, G. N84-17654
DUDLEY, W. A. N84-17567
DUNBAR, M. N84-17737
DUNCAN, L. M. N84-17739
DUNCAN, T. J. N84-17121
DUPREE, A. K. N84-18121
DURFEE, R. C. N84-17678
DUTTON, E. J. N84-17475
DUYSEMALIYEV, U. K. N84-17361
DWIGHT, K. N84-17357
DYER, I. N84-17737

E

EARNEST, C. N84-17748
EATHERLY, W. P. N84-17297
EBERT, L. J. N84-17353
N84-17354
ECKERT, R. N84-17470
EDGAR, D. E. N84-17679
EDGAR, R. J. N84-17529
EDWARDS, R. G. N84-17678
EGELAND, A. N84-17255
EGOLF, T. A. N84-17149
EHLEN, J. N84-17672
N84-17675
EHRENBORG, C. N84-17916
EHRENFRIED, D. H. N84-17911
EISEMAN, P. R. N84-17941
EISENBERG, R. N84-17360
EISENTRAUT, D. K. N84-17176
EKEROOT, L. N84-17917
EKONOMOV, A. P. N84-18135
ELGAMAL, A. N84-17984
ELGERED, G. N84-17746
ELIAS, R. W. N84-17712
ELLIOTT, R. A. N84-18015
ELRAZAZ, Z. N84-17869
ELSBERRY, R. L. N84-17795
EMIN, D. N84-17388
EMMONS, H. W. N84-17162
EMSLIE, A. G. N84-18142
ENDICOTT, D. L., JR. N84-17450
ENGLUND, C. E. N84-17825
EPOV, A. A. N84-18064
ERDOGAN, F. N84-17617
N84-17618
N84-17619
ERHARD, H. N84-17321
ERNST, W. N84-18117
ESPELAND, R. H. N84-17473
ESTABROOK, K. N84-18060
ESTES, J. M. N84-17435
EUBANK, P. T. N84-17330
EVANS, C. B. N84-17207

F

FABIAN, A. C. N84-18123
FAIRES, L. M. H. N84-18059
FALK, L. N84-17682
FALTENS, A. N84-18042
FARBER, M. N84-17398
FARLOW, G. C. N84-17403
FARMER, C. B. N84-18046
FARR, E. N84-17444
FARREN, J. N84-17506
FAWLEY, W. M. N84-17585
FAY, S. N84-17216
FEDULOV, A. P. N84-18064
FEIGELSON, R. S. N84-18066
FELKER, B. N84-17568
N84-18062
FELTEN, J. E. N84-18132
FELTZ, T. F. N84-17173
N84-17174
FENNELL, J. F. N84-17254
FEO, T. A. N84-17910
FERNANDEZ-PELLO, A. C. N84-17326
FERZIGER, J. H. N84-17528
FETT, R. W. N84-17240
FICHTEL, C. E. N84-18151
FIELD, R. T. N84-17729
FIFE, D. J. N84-17687
FILIPPI, C. A. N84-17469
FIORE, A. W. N84-17545
FLETCHER, A. D. N84-17163
FOGLE, W. E. N84-17566
FOLEY, M. J. N84-17287
FOLLSTAEDT, D. M. N84-17371
FONG, F. K. N84-17810
FONG, Z. S. N84-17576
FORD, A. N84-18033
N84-18035
FORNES, R. E. N84-17292
FORSBECK, A. N84-17159
FRANK, L. A. N84-17265
FRANSSON, J. N84-17979
FRANTSENYUK, I. V. N84-17589
FRATINI, A. V. N84-17393
FREDERKING, T. H. K. N84-17527
FREELAND, R. N84-17233
FREEMAN, V. T. N84-17834
FRIEDLAND, S. S. N84-17565
FRIEDMAN, M. N84-17740
FRITSCH, F. N. N84-17972
FROLOV, V. Y. N84-17476
FROST, W. N84-17574
FRY, C. R. N84-17430
FULKERSON, E. S. N84-17501
FULLER, G. M. N84-17833

FUNKHOUSER, G. E. N84-17830
FURR, R. N84-17187
FURUSTIG, H. N84-17863
FUSSELL, P. S. N84-17595

G

GALEEV, A. A. N84-17511
GALLACHER, P. C. N84-17795
GALLAGHER, D. L. N84-17276
GALLAGHER, N. C., JR. N84-17568
N84-18062
GALLIS, M. R. N84-17544
GALLIVAN, K. A. N84-17978
GAMACHE, R. R. N84-17732
GARBA, J. A. N84-17233
GARDNER, J. E. N84-17135
GARMLAND, S. N84-17192
GARNER, F. A. N84-17379
GARNER, J. H. B. N84-17712
GARWOOD, R. W., JR. N84-17795
GATTIS, T. H. N84-17563
GAUTIER, M. A. N84-17318
GAVIN, L. N84-17942
GDALEVICH, G. L. N84-17208
GEBALLE, T. H. N84-18068
GEDEON, L. N84-17268
GEE, A. W. J. D. N84-17593
GELINAS, R. N84-17585
GENN, S. N84-18088
GEORGE, T. F. N84-17581
GERASIMOV, A. I. N84-18029
GERLA, M. N84-17928
GERSTENMAIER, W. H. N84-17525
GHONIEM, N. M. N84-18055
GHOSH, M. K. N84-17592
GIAMPAPA, M. S. N84-18121
GIBBS, P. N84-18125
GIESELER, P. B. N84-17472
GILAT, A. N84-17345
GILBERT, R. D. N84-17292
GILLESPIE, T. D. N84-17598
GILLIAM, W. L. N84-17207
GINGRAS, D. F. N84-17970
GIRATA, P. T., JR. N84-17288
GIRNTKE, H. N84-17183
GLASS, J. T. N84-17626
N84-17627
GNEDIN, L. P. N84-18011
GOEKSTORP, P. N84-17460
GOEL, P. N84-17133
GOERANSSON, G. N84-17458
GOERTZ, C. K. N84-18136
GOLD, M. N84-17323
GOLDMAN, A. I. N84-17363
GOLDMAN, D. T. N84-17406
GOLDSTEIN, M. L. N84-18131
GOLOVKIN, A. V. N84-18010
GONCALVESDASILVA, M. A. N84-17788
GONZALEZ-BLAZQUEZ, A. N84-17243
GOODMAN, J. B. N84-17976
GOODWIN, R. D. N84-17329
GOODYEAR, M. J. N84-17136
GORDON, W. E. N84-17739
GORET, J. N84-17299
GOSLEE, J. W. N84-17235
N84-17236
GOTWALS, E. N84-17122
GOURDIN, W. H. N84-17404
GRAFTON, S. B. N84-17184
GRAHAM, M. H. N84-17902
GRAHAM, R. A. N84-18075
GRANDT, A. F., JR. N84-17616
GRARD, R. N84-17261
N84-17273
GRASS, H. M. N84-17452
GRAY, R. M. N84-17984
GREBOWSKY, J. M. N84-17265
GREEN, J. L. N84-17276
GREEN, R. E., JR. N84-17626
N84-17627
GREENBERG, H. S. N84-17226
GREENBLATT, M. N84-17307
GREENHALGH, S. N84-17147
GRIFFIN, C. R. N84-17435
GRIFFITH, W. L. N84-17597
GRIFFITHS, H. D. N84-17683
GRIFFITHS, H. W. N84-17603
GRIGGS, M. N84-17757
GROEBKE, H. N84-17765
GROENEVELD, R. L. N84-17788
N84-17789
GROENEWOLD, G. H. N84-17685
GROSS, K. P. N84-17519
GROTE, A. N84-17480
GROVER, B. C. N84-17492
GRUBER, A. N84-17748
GRUEN, A. W. N84-18048
GRUEN, D. M. N84-17373
N84-18040
GUAGNAN, C. N84-17967
GUANGMING, X. N84-17201
GUBSKY, V. F. N84-17208
GUILL, F. G. N84-17154
N84-17155
GULKO, E. N84-17456
GUNNING, W. J. N84-18050
GUNTHER, J. E. N84-17180
GUPTA, S. S. N84-17957
N84-17962
N84-17985
GURNETT, D. A. N84-17265
GUSSENHOVEN, M. S. N84-17275
GUSTAFSON, H. N84-17187
GUSTAVSSON, L. N84-17864
GUYENNE, D. N84-17253
GUZDAR, P. N. N84-17734

H

HAAS, J. F. L. N84-17517
HAERENDEL, G. N84-17261
HALE, J. K. N84-17958
HALFORD, G. R. N84-17350
HALL, H. J. N84-18113
HALL, J. R., JR. N84-17427
HALLER, R. N84-17474
HALLICK, T. M. N84-17855
HALPERN, J. B. N84-18026
HALVORSON, P. F. N84-17684
HAMILTON, M. L. N84-17379
HAMM, L. L. N84-17550
HAMM, R. M. N84-17841
HAMM, R. W. N84-17900
HAMROCK, B. J. N84-17592
HAN, L. M. N84-17291
HANDIN, J. N84-17740
HANELY, T. R. N84-17401
HANES, D. M. N84-17540
HANIU, H. N84-17554
HANKS, B. R. N84-17218
HANS, P. N84-17765
HANSELMANN, G. N84-17696
HANSEN, W. N84-17417
HANSON, R. K. N84-17317
N84-17320
HARDING, R. N84-17139
HARDY, L. C. N84-17305
HARDY, R. J. N84-18031
HARRIES, W. L. N84-17576
HARRINGTON, R. F. N84-18007
HARRIS, D. O. N84-17615
N84-17622
HARRIS, J. E. N84-17212
HARRIS, J. M. N84-17742
HARRIS, S. A. N84-18099
HARRIS, S. P. N84-17398
HARTIG, W. N84-17383
HARTLEY, R. L. N84-18098
HARTMANN, L. W. N84-18121
HARTY, R. B. N84-18045
HARVEY, C. C. N84-17259
HARVEY, E. D. N84-17567
HASHIOKA, M. H. N84-17926
HASSAM, A. B. N84-17734
HASSELMANN, K. N84-17737
HASSELTON, A. J. N84-17706
HAUCK, H. N84-17645
HAUPT, R. J. N84-17160
HAWKINS, G. F. N84-17359
HAYDON, G. W. N84-17468
HEAD, V. L. N84-17525
HEARD, W. L., JR. N84-17219
HEATH, D. F. N84-17743
HEBNER, R. E. N84-17509
HEFFERNAN, A. P. N84-17425
HEGG, R. G. N84-17180
HEINISCH, H. L. N84-17368
HEINZ, R. N84-17183
HEISER, W. N84-17145
HELLSTEN, H. N84-17918
HELMINCK, G. F. N84-17937
HELMINIAK, T. E. N84-17401
HELZER, S. G. N84-17427
HEMMER, G. L. N84-17782
HENCH, L. L. N84-17391
HENDERSON, F. M. N84-18020
HENDRICKS, R. C. N84-17533
HENNESSY, D. G. N84-17365
HENNESSY, J. N84-17494
HEPLER, W. A. N84-17527
HEPPNER, D. B. N84-17855
N84-17857
HERBERT, J. J. N84-17248
HERD, G. R. N84-17154
N84-17155
HERELD, M. N84-17717
HERMAN, T. N84-17904
HERNITER, B. N84-17731
HERRMANN, H. N84-17169
HERZBERGER, K. N84-17646
HESS, K. N84-18069
N84-18071
HETZEL, H. N84-17322
HEVENOR, R. A. N84-17438
HEYL, W. J. N84-18083
HIBLER, W. D., III N84-17737
HICKMAN, R. B. N84-18012
HICKS, R. M. N84-17144
HIEMSTRA, J. D. N84-18102
HIGGINS, A. M. N84-17145
HIGGINS, E. A. N84-17830
HILDEBRANDT, G. N84-17659
HILDNER, E. N84-18141
HINDMARSH, A. C. N84-17974
HINSHELWOOD, D. D. N84-17886
HINSON, W. F. N84-17234
HINTON, B. B. N84-17773
HISHINUMA, A. N84-17374
HISKES, J. R. N84-18031
HO, F. P. N84-17766
HOAD, D. R. N84-18018
HOARD, R. W. N84-18012
HOBBIE, J. E. N84-17680
HOERNER, W. N84-17321
HOFF, H. A. N84-17380
HOFFMAN, I. L. N84-17121
HOFFMANN, H. E. N84-17763
HOGGE, R. N84-17145
HOLMES, R. N84-17610
HOLMGREN, M. N84-17422
HOLST, J. A. N84-17629
HOMCE, G. T. N84-17868
HOMSY, G. M. N84-17522
HONEA, R. B. N84-17678
HOOGENDOORN, P. J. N84-17997
HOOVER, J. B. N84-17794
HORNING, R. R. N84-18110
HOU, J. W. N84-17516
HOUGHTON, R. A. N84-17680
HOUSE, L. N84-17608
HOWARD, J. H., JR. N84-18019
HOWELL, H. R. N84-17523
HREBIEN, L. N84-17823
HSIE, E. Y. N84-17779
HUANG, K. H. N84-17574
HUBA, J. D. N84-17734
HUBBARD, H. H. N84-18017
HUBERTZ, J. M. N84-17791
HUCHRA, J. P. N84-18121
HUFFORD, G. A. N84-17467
HUGGINS, A. W. N84-17782
HUI, W. H. N84-17137
HULTEN, G. N84-17705
HUMES, D. H. N84-17575
HUNKINS, K. N84-17797
HUNSAKER, M. N84-17393
HUNT, J. N84-17253
HUSSAIN, Z. N84-18080
HUSSAINI, M. Y. N84-17118
N84-17119
HUTCHINSON, M. N84-17581
HUYNH, Q. N84-17966
HWANG, Y. S. N84-17489
HYATT, R. N84-17608
HYND, D. A. N84-17605

I

IMAMURA, M. S. N84-17686
IP, W. I. N84-18136
IRWIN, J. S. N84-17774
ISTOMIN, V. G. N84-18134
ITOH, T. N84-17443

J

JACKSON, C. B. N84-17178
JACKSON, K. E. N84-17175
JACOBS, G. B. N84-17577
N84-17578
JAEGER, L. E. N84-17903
JAFARI, A. H. N84-17614
JAMESON, A. N84-17977

JANKOWSKY, E. J. N84-17356
JANOWITZ, M. F. N84-18052
JAROSS, R. A. N84-17502
JASKOLLA, F. N84-17668
JENKINS, T. F. N84-17671
JENSEN, D. W. N84-17963
JENSEN, R. E. N84-17792
JENSEN, R. K. N84-17594
JENSEN, V. S. N84-17845
JERABEK, M. N84-17869
JIAN, H. N84-17201
JILLIE, D. W. N84-18074
JINZHONG, W. N84-17204
JIRONG, Z. N84-17967
JOHANNESSEN, O. M. N84-17737
JOHNSON, B. V. N84-17530
JOHNSON, E. L. N84-17690
N84-17693
JOHNSON, J. F. E. N84-17262
N84-17263
JOHNSON, J. W. N84-17214
JOHNSON, M. N84-18138
JOHNSON, T. L. N84-17313
N84-17930
JONES, B. H. N84-17824
JONES, D. H. P. N84-18126
JONES, F. C. N84-18150
JONES, L. L. N84-17862
JONES, R. L. N84-17186
JONES, W. L. N84-17784
JOSSEFSSON, R. N84-17705

K

KADYSHEVSKII, V. S. N84-18053
KAGE, G. D., II N84-17120
KAHANA, S. N84-18034
KAILATH, T. N84-17984
KALAFUS, R. M. N84-17170
KALAGIAN, G. N84-17470
KALISKI, M. E. N84-17930
KANADE, T. N84-17861
KANE, M. F. N84-17749
KANTOWITZ, B. H. N84-17858
N84-17859
KAPETANAKOS, C. A. N84-18030
KAPLAN, A. M. N84-17698
KAPLAN, D. L. N84-17698
KARCHER, E. A. N84-17181
KAREIVA, P. M. N84-17945
N84-17946
KARLIN, A. R. N84-17888
KARLSSON, E. N84-17707
KARLSSON, H. N84-17707
KARO, A. M. N84-18031
KAROW, K. N84-17913
KASCAK, A. F. N84-17590
KASEMSET, D. N84-18069
KASIRAJ, P. N84-17369
KASPEROVICH, E. B. N84-17588
KATSANIS, T. N84-17138
KATZ, I. N84-17255
N84-17268
KAUFMAN, L. N84-17974
KAUFMANN, H. N84-17638
KAUL, R. N84-17138
KEAFER, L. S. N84-17234
KECKLER, C. R. N84-17228
N84-17229
KEEFE, D. N84-18042
KEHOE, A. B. N84-17550
KELLER, D. L. N84-17772
KELLER, H. L. N84-17933
KELLEY, R. F. N84-17735
KELLY, E. J. N84-17454
KEMP, W. B., JR. N84-17189
KENNEDY, C. R. N84-17297
KERSHAW, R. N84-17357
KERSTEEN, Z. A. N84-17433
KETELLE, R. H. N84-17677
KETTLER, R. N84-17980
KEVORKIAN, J. N84-17950
KHARITONOV, A. O. N84-17415
KIDMAN, R. B. N84-18143
KILGER, R. N84-17644
KILLOUGH, G. G. N84-17702
KIM, S. W. N84-17126
KIM, Y. I. N84-17527
KING, K. J. N84-17313
KINGSBURY, E. N84-17591
KISSICK, W. A. N84-17467
KITROSSER, D. F. N84-17732
KITTLER, J. V. N84-17897
KITTLER, L. B. N84-17834
KJELAAS, A. G. N84-17665
KLEBANOFF, L. E. N84-18080
KLEINSTEIN, B. H. N84-17805
KLIMOV, S. I. N84-17511
KLUEH, R. L. N84-17377
KLUESENER, M. F. N84-17217
KNAPP, G. P. N84-17800
KNAPP, J. A. N84-17371
KNEPPERS, H. A. W. M. N84-17989
KNIFFEN, D. A. N84-18151
KNIGHT, J. C. N84-17900
KNOTT, K. N84-17256
N84-17262
N84-17277
KNOX, C. E. N84-17165
KNUCKEY, P. J. N84-17301
KO, T. N84-17171
KOCH, J. N84-17695
KOETHE, H. K. N84-17504
KOKOTOVIC, P. V. N84-17179
KOLB, M. A. N84-18087
KOLDE, W. F. N84-18022
KOLEVA, R. N84-17208
KOLLODGE, J. C. N84-17166
KOLZUNOVA, L. G. N84-17386
KONDORSKAYA, N. V. N84-17744
KOOB, R. D. N84-17685
KOONS, H. C. N84-17254
KOPP, O. N84-17420
KOPP, R. N84-17383
KOPRIVA, D. A. N84-17118
N84-17119
KORCEK, S. N84-17594
KORN, A. N84-17171
KORTH, A. N84-17256
KOSKI, J. A. N84-17584
KOSTAREV, I. V. N84-17415
KOSTISHACK, D. F. N84-18139
KOSTKA, D. N84-17369
KOSZENSKI, E. P. N84-17856
KOTENEV, V. I. N84-17414
KOTERAS, J. R. N84-17633
KOTEWEVA, V. Y. N84-17414
KOTLAR, A. J. N84-17579
KOVARSKII, N. Y. N84-17386
KRAEMER, F. N84-17648
KRAMER, M. R. N84-17877
KRASNOSCEK, J. S. N84-17418
KRAUSS, A. R. N84-17373
KRIJT, G. D. N84-17706
KRINSKY, I. S. N84-17258
KRINSKY, J. S. N84-17252
KRISHNAMURTHY, L. N84-17543
KRISHNASWAMY, S. N84-18130
KROGER, H. N84-18074
KRONAUER, R. N84-18049
KROTSCHECK, E. N84-18124
KRUER, W. L. N84-18060
KRUGER, J. N84-17363
KRUPKE, W. F. N84-18063
KUCIAUSKAS, A. P. N84-17782
KUHN, G. D. N84-17535
KUKEKOV, G. A. N84-17476
KULL, J. N84-17689
KULOS, M. S. N84-17893
KUMAR, R. N84-17869
KUMMER, F. N84-17321
KUNDT, W. N84-18124
KUO, S. P. N84-18054
KURIYAMA, M. N84-17383
KUROKAWA, E. N84-17596
KUTIEV, I. N84-17208
KUZNETSOVA, E. G. N84-17336
KWOK, M. A. N84-17580
KWON, T. M. N84-17492

L

LADELL, L. N84-17459
LAFRAMBOISE, J. G. N84-17267
LAI, S. T. N84-17275
LAKIN, W. D. N84-17532
LAM, N. Q. N84-17375
N84-17380
LAMERIS, J. N84-17620
LAMM, P. K. D. N84-17946
LAND, F. N84-17459
LANDGREBE, A. J. N84-17149
LANDMAN, L. C. N84-17599
LANG, D. D. N84-18062
LANGE, B. N84-17285
LARKIN, W. N84-17834
LARSON, R. E. N84-17794
LAUER, J. L. N84-17410
LAWLER, E. E., III N84-17842
LAWSON, R. P. N84-17770
LAZARUS, A. J. N84-18149
LEACH, J. N84-18142
LEBER, R. L. N84-18012
LEBLANC, R. N84-17553
LEBOEUF, R. N84-17833
LEBRETON, J. P. N84-17278
LECOMPTE, J. L. N84-17782
LEDLEY, B. G. N84-17255
LEE, E. H. N84-17374
LEE, J. D. N84-17139
N84-18012
LEE, J. H. N84-17575
LEE, J. M. N84-17527
LEE, K. J. N84-17557
LEE, K. T. N84-17581
LEE, L. S. N84-17801
LEE, S. J. N84-17890
LEE, Y. N84-17575
LEE, Y. T. N84-17309
LEFEBVRE, M. N84-17683
LELAND, T. W. N84-17332
LELGEMANN, D. N84-17645
N84-17681
LEMBKE, J. R. N84-17862
LEMOINE, A. J. N84-17960
LENGRAND, J. C. N84-17290
LENSTRA, A. K. N84-17998
LENSTRA, H. W., JR. N84-17990
N84-17993
N84-17999
LEONARD, J. I. N84-17820
N84-17821
LEPPARANTA, M. N84-17799
LEPPLE, F. K. N84-17794
LESKOVAR, B. N84-18022
LEU, L. Y. N84-17962
N84-17985
LEUNG, M. S. N84-17254
LEVEQUE, R. J. N84-17976
LEVY, B. N84-17954
LEVY, E. N84-17796
LEWIS, C. E. N84-17475
LI, Z. L. N84-17630
LICHTEN, S. M. N84-18129
LIDIAK, E. G. N84-17727
LIEBENBERG, D. H. N84-17316
LIEWALD, M. N84-17922
LIGHTMAN, A. J. N84-17542
LIGTERINGEN, H. N84-17786
N84-17788
LIMAYE, S. S. N84-18137
LIN, R. P. N84-18148
LINDQUIST, A. N84-17951
LINDQVIST, P. A. N84-17257
N84-17264
LINDSEY, W. C. N84-17431
LINVILL, D. F. N84-17767
LLOYD, J. L. N84-17468
LOEWY, R. G. N84-17293
LOHMAR, F. J. N84-17647
LOMBARD, C. K. N84-17936
LONG, G. G. N84-17363
LONGLEY, A. G. N84-17467
LOREE, T. R. N84-17319
LOU, X. C. N84-17949
LOUBERSAC, L. N84-17661
LOVELAND, D. W. N84-17953
LOVELOCK, R. L. N84-17871
LOVETT, G. M. N84-17700
LOWE, C. N84-17177
LOYD, B. N84-18090
LOZHA, M. T. N84-17812
LUCAS, D. L. N84-17468
LUI, R. N84-17942
LUNDH, P. N84-17746
LUNIN, V. P. N84-17476
LUSTIGER, A. N84-17405
N84-17608
LUSTMAN, L. N84-17966
LYUTS, V. Y. N84-17612

M

MA, G. J. N84-17291
MACAIONE, D. P. N84-17394
MACKAY, R. A. N84-17353
MACNAUGHTON, M. G. N84-17827
MAGILL, P. D. N84-17542
MAGNOTTI, F. N84-17520
MAGRAB, E. B. N84-17638
MAHONEY, L. R. N84-17594
MAIRSON, H. G. N84-18104
MAISEL, J. E. N84-17606
MAIYA, P. S. N84-17378
MAJEROWICZ, S. N84-17626
N84-17627

MAJKA, R. J. N84-17206
MAKO, F. N84-18030
MAKSHTAS, A. P. N84-17752
MALKAN, M. A. N84-18128
MALL, G. H. N84-17560
MANGOT N84-17282
MANHEIMER, W. N84-18030
MANLEY, T. O. N84-17797
MANN, W. C. N84-17929
MANNA, Z. N84-17884
MANNING, J. R. N84-17384
MANSUR, L. K. N84-17374
MAPPER, D. N84-17505
N84-17506
MARASCHIN, R. N84-17689
MARGETAN, F. J. N84-17971
MARGLE, S. M. N84-17678
MARIANI, F. N84-18149
MARIOTTI, J., JR. N84-17198
MARK, J. W. N84-18057
MARKWITZ, W. N84-17656
MAROCHNIK, L. S. N84-18127
MARSAL, F. N84-17507
N84-17508
MARSH, B. D. N84-17722
MARTIN, D. L. N84-17822
MARTINEZ-GARCIA, J. J. N84-17243
MARTINO, J. N84-17312
MARTINS, J. P. N84-17894
MARUGAN, J. N84-17242
MASON, W. H. N84-17130
MASSIN, J. M. N84-17662
MATKOWSKY, B. J. N84-17306
MATTHAEUS, W. H. N84-18131
MATTHEWS, R. N84-17494
MATTY, D. G. N84-17870
MATULAITIS, J. N84-17520
MAU, T. K. N84-18055
MAUGHMER, M. D. N84-17140
MAYBERRY, M. C. N84-17566
MAZIASZ, P. J. N84-17370
MAZUREK, W. N84-17387
MCALLISTER, P. R. N84-18095
N84-18096
MCCAMMON, D. N84-18147
MCCARTHY, G. J. N84-17685
MCCLELLAN, V. A. N84-17178
MCCLENON, P. R. N84-18092
MCCONNELL, R. N84-17869
MCDONALD, F. B. N84-18149
MCDONALD, F. E. N84-18009
MCDONALD, G. C. N84-17957
MCGAW, M. A. N84-17350
MCGREGOR, W. K. N84-17288
MCHARGUE, C. J. N84-17403
MCKEAGUE, I. W. N84-17961
MCKEE, T. B. N84-17755
MCKENNA, P. J. N84-17536
MCMILLAN, O. J. N84-17131
MCNUTT, R. L. N84-17260
MEAD, R. N84-18103
MEDECKI, H. N84-17564
MEIJERINK, J. A. N84-17980
MELILLO, J. M. N84-17680
MELSA, J. L. N84-17485
N84-17486
MEMORY, J. D. N84-17292
MENDELZON, A. O. N84-17902
MENDENHALL, M. R. N84-17129
N84-17131
MENDILLO, M. N84-17731
MERRILL, R. G. N84-17743
MESSERSCHMID, E. N84-17202
MEYER-ROUX, J. N84-17658
MEYER, G. G. L. N84-17496
N84-17607
MEYER, L. N84-18112
MEYER, R., JR. N84-17250
MEYZAUD, Y. N84-17349
MICHAEL, I. N84-17281
MIELKE, R. R. N84-17436
MIGULIN, A. I. N84-17752
MILLER, A. R. N84-17453
MILLER, D. N84-17765
MILLER, E. L. N84-17206
MILLER, J. F. N84-17766
N84-17777
MILLIGAN, R., JR. N84-17595
MILLS, J. D. N84-17485
N84-17486
MILLS, R. L. N84-17316
MINDERMAN, D. N84-17297
MINER, E. W. N84-17968
MINGDA, G. N84-17362
MINGGAO, Y. N84-17362
MIRONOV, O. M. N84-18010
MISRA, J. N84-17986
N84-18105
MITCHELL, J. L. N84-17764
MITCHELL, K. E. N84-17761
MITCHELL, T. J. N84-18094
MITLER, H. E. N84-17162
MITTER, S. K. N84-17954
MITTRA, R. N84-17444
MIYAKE, N. N84-17901
MIYAKODA, K. N84-17780
MIYOSHI, K. N84-17351
N84-17352
MIZERA, P. F. N84-17254
MOBRAY, D. N84-17892
MODDEMAN, W. E. N84-17412
N84-17413
MOECKL, B. N84-17285
MOERGENTHALER, K. D. N84-17183
MOET, A. N84-17399
MOHRMAN, A. M., JR. N84-17842
MOL, A. N84-17788
N84-17789
MOORE, M. L. N84-18109
MOORE, R. C. N84-17905
MOORE, R. K. N84-17642
MOORMAN, J. C. N84-17215
MORF, M. N84-17964
MORGENTHALER, S. N84-17944
MORKOVIN, M. V. N84-17548
MORLEY, L. A. N84-17865
N84-17866
N84-17867
N84-17868
MOROZ, V. I. N84-18134
N84-18135
MORRIS, M. D. N84-18094
MORROW, G. E. N84-17177
MORTON, T. E. N84-17934
MOSER, J. N84-17942
MOSER, R. L. N84-17686
MOSHKIN, B. E. N84-18135
MRIG, L. N84-17688
MUELLER, W. N84-17646
MUILWIJK, D. N84-17465
N84-17466
MUKHAMEDOV, E. G. N84-17815
MUKHIN, L. M. N84-18127
N84-18134
MULCAHY, T. M. N84-17611
MULLEN, R. L. N84-17533
MUNTZ, E. P. N84-17359
MURPHY, G. B. N84-17265
MURPHY, W. C. N84-17581
MURRI, D. G. N84-17184
MYNETT, A. E. N84-17787

N

NAGLE-ESHLEMAN, J. N84-17609
NAITOH, P. N84-17825
NAKAMURA, S. N84-17935
NAKAMURA, Y. N84-17725
NAKANO, Y. N84-17671
NALBANDIAN, S. J. N84-17225
NAMORDI, M. R. N84-17483
NARIN, F. N84-18095
N84-18096
NATHAL, M. V. N84-17354
N84-17355
NAUMANN, K. H. N84-17332
NEILSON, R. H. N84-17392
NEMEYER, G. F., JR. N84-17885
NERUBASHCHENKO, V. V. N84-17338
NESS, N. F. N84-18149
NETO, G. C. N84-18100
NEUBRAND, F. N84-17183
NEWKIRK, J. N84-17494
NEWMAN, D. N84-17901
NEWMAN, J. N84-17975
NGUYEN, H. P. N84-17282
NGUYEN, L. T. N84-17184
NICOL, M. F. N84-18138
NICOLET, W. E. N84-17150
NIEDERDELLMANN, G. N84-17322
NIELSEN, J. N. N84-17535
NIEUWESTADT, F. T. M. N84-17706
NIGHTINGALE, N. N84-18117
NIKOLSKII, V. N. N84-17414
NILSSON, S. N84-17459
NISHIMOTO, T. S. N84-17227
NNAJI, S. N84-17767
NOAKES, D. R. N84-18078
NOBLE, J. V. N84-18039
NOMURA, E. N84-17307
NOREM, J. N84-18036
N84-18041
NORTON, D. J. N84-17244
N84-17245
N84-17246
NOSKOV, A. S. N84-17513
NOTTARP, K. N84-17644
NOVAK, T. N84-17865
NOVIKOV, V. S. N84-17819
NOVOZHILOV, G. I. N84-17813
NOWLIN, D. V. N84-17121
NOYES, R. W. N84-18121
NOZDRACHEV, M. N. N84-17511
NUNZ, G. J. N84-18093
NYGREN, S. N84-17457
NYO, H. L. N84-18007

O

OBRIEN, W. P., JR. N84-17790
ODOM, E. M. N84-17294
ODONNELL, K. A. N84-18118
OHATA, C. A. N84-17831
OKEEFE, K. J. N84-17233
OLESOV, Y. G. N84-17338
OLIPHANT, J. L. N84-17671
OLLENDORF, S. N84-17222
OLSEN, A. D., JR. N84-17173
N84-17174
OLSEN, R. C. N84-17252
N84-17258
N84-17262
N84-17276
N84-17277
OLVER, T. E. N84-17493
OLWELL, K. D. N84-18031
ONEILL, J. J. N84-17563
ORE, E. L. N84-17637
ORGANIC, V. J. N84-17181
ORMSBEE, A. I. N84-17140
ORSINI, S. N84-17264
ORTHS, K. N84-17340
OSULLIVAN, G. A. N84-17688
OTOOLE, A. J. N84-18019

P

PACKAN, N. H. N84-17374
N84-17376
PALKO, R. L. N84-17139
PALMER, J. F. N84-17154
N84-17155
PANOV, V. V. N84-17752
N84-17753
PANYYSHKIN, A. V. N84-17753
PAPAMASTORAKIS, I. N84-17720
PAPE, H. G. N84-17704
PAPP, J. F. N84-17385
PARASURAMAN, R. N84-18019
PARK, D. N84-17883
PARK, S. O. N84-17543
PARKER, A. C. N84-17869
PARKER, L. W. N84-17266
N84-17270
N84-17274
PARMENOV-TRIFILOV, B. I. N84-17818
PARRISH, K. A. N84-17166
PASCHMANN, G. N84-17720
PASHINTSEV, V. T. N84-17280
PASTUKHOV, V. V. N84-17813
PATEL, V. C. N84-17539
PATIN, M. N84-17282
PATTERSON, J. O. N84-18121
PAVLOVSKIY, A. I. N84-18029
PEARLMAN, W. A. N84-17484
PEARSON, A. E. N84-18091
PEDERSEN, A. N84-17253
N84-17256
N84-17261
N84-17262
N84-17264
N84-17277
PEDROTTI, L. R. N84-17568
N84-18062
PELLIN, M. J. N84-18040
PENNOCK, G. R. N84-17851
PEPPER, D. W. N84-17550
PEPPER, W. B. N84-17151
PEREL, J. N84-17289
PERKINS, S. C., JR. N84-17129
N84-17131
PERKINS, W. R. N84-17179
PEROUTKA, M. R. N84-17775
PEROUTKY, J. D. N84-17676
PERRIER, M. N84-17188
PERRY, A. J. N84-17341

PERRY, A. M. N84-17703
PETERS, D. A. N84-17171
PETERSEN, H. N84-17322
PETERSON, N. L. N84-18079
N84-18081
PETERSON, W. M. N84-17685
PETROSIAN, V. N84-18142
PHILLIPS, N. E. N84-17566
PHILLIPS, P. S. N84-17127
PHILLIPS, T. N. N84-17621
PIANCA, G. N84-17569
PICKERING, H. W. N84-17364
PICRAUX, S. T. N84-17371
PIMENTAL, N. A. N84-17826
PIN, F. G. N84-17677
PIOTROWSKI, T. N84-18107
PITA, C. R. A. M. N84-17788
PITZ, W. J. N84-17327
PLAHOV, N. N. N84-17813
PLOSHAY, J. J. N84-17780
PNUELI, A. N84-17884
PODAIRE, A. N84-17666
POGASH, R. N84-17846
POHL, H. C. N84-17335
POHLIG, S. C. N84-17447
POLLOCK, T. C. N84-17244
N84-17245
N84-17246
POLZELLA, D. J. N84-17190
POMERANCE, C. N84-17995
POMRANING, G. C. N84-18055
POOLE, B. R. N84-18054
POOLE, M. A. N84-17448
POORMAN, R. N84-17239
POPE, L. E. N84-17371
POPOV, A. N. N84-17589
PORTEIRO, J. L. F. N84-17244
N84-17245
N84-17246
POSSA, G. N84-18016
POSTUCHOW, J. R. N84-17248
POTAPENKOV, A. P. N84-17588
POTTER, J. M. N84-17623
POUSSIN, J. F. N84-17507
N84-17508
POVINELLI, L. A. N84-17142
N84-17525
POWELL, J. D. N84-17499
POWERS, D. A. N84-17808
POWERS, G. D. N84-17831
PRICE, C. H., JR. N84-17691
PRICE, J. C. N84-17641
PRIETO-LLANOS, T. N84-17243
PRIETO-VILLALBA, J. N84-17243
PRITCHARD, N. D., JR. N84-17547
PROSNITZ, D. N84-17585
PRUMBAUM, R. N84-17340
PRUZAN, P. N84-17316
PU, S. L. N84-17625
PUGH, E. N84-17942
PUKACH, L. P. N84-17815
PULITINA, P. N84-17569
PURVIS, C. K. N84-17269
PUTINTSEVA, R. G. N84-18053

Q

QIN, X. N84-17751
QUATE, C. F. N84-17421
QUINN, R. N84-17288

R

RABINOVICH, E. M. N84-17414
RACHAMADUGU, R. M. V. N84-17934
RAEUCHLE, W. N84-17183
RAFFIN, M. N84-17290
RAFINEJAD, D. N84-17689
RAMAKER, D. E. N84-17314
RAMAPRIAN, B. R. N84-17539
N84-17554
RAO, A. R. N84-17679
RAPLEY, C. G. N84-17683
RASCH, K. D. N84-17694
RAUCHAS, A. N84-18036
RAULT, R. N84-17282
N84-17283
RAYMOND, J. C. N84-18121
READING, J. F. N84-18033
N84-18035
REALLAND, J. C. N84-17282
REARIC, D. M. N84-17798
REASONER, D. L. N84-17265
REAZER, M. J. N84-17153
REDDY, K. R. N84-17128
REHM, B. W. N84-17685
REHN, L. E. N84-17380
REID, R. L. N84-17691
REILLY, J. P. N84-17834
REINNITZ, F. N84-17798
REINHARD, F. N84-17323
REINISCH, B. W. N84-17732
REISER, M. N84-18032
REITER, E. R. N84-17726
REM, M. N84-17880
REYNAUD, A. H. N84-17223
REYNOLDS, W. C. N84-17528
REZUS, A. N84-17938
RHEA, J. O. N84-17782
RICHARDSON, R. L. N84-17632
RICHEY, A. N84-18117
RIFKIN, R. N84-17448
RINALDUCCI, E. J. N84-17839
RIPKA, G. N84-18034
RISBERG, S. N84-17458
RISBY, T. H. N84-17713
RITCHIE, W. N84-17674
RITTER, J. J. N84-17363
RIVEREAU, J. C. N84-17652
N84-17653
ROBACK, R. N84-17530
ROBBINS, K. D. N84-17767
ROBERTS, T. W. N84-17526
ROBEY, S. W. N84-18080
ROBINSON, G. Y. N84-18072
ROBSON, D. N84-18038
ROBSON, R. R. N84-17481
ROCHE, J. C. N84-17268
RODI, A. R. N84-17770
ROHDENBURG, C. N84-18117
ROSE, M. E. N84-17621
ROSEN, B. S. N84-17130
ROSENBLAT, S. N84-17541
ROSENFELD, A. N84-17670
N84-18106
ROSFJORD, T. J. N84-17407
ROSINSKI, J. N84-17959
ROSS, R. R. N84-18123
ROSSOW, M. P. N84-17171
ROTH, E. P. N84-17692
ROTH, P. N84-17721
ROTT, H. N84-17660
ROTTA, J. C. N84-17123
ROY, A. K. N84-17392
ROYCE, B. S. H. N84-17311
ROZHIKHINA, I. D. N84-17342
RUBERT, R. R. N84-18062
RUBIN, A. G. N84-17268
RUBIN, I. N84-17928
RUDNYY, N. M. N84-17837
RUFF, I. N84-17748
RUFFIE, J. P. N84-17507
N84-17508
RUFFT, D. J. N84-17866
RUNGE, F. C. N84-17231
RUSH, R. M. N84-17678
RUSSELL, C. T. N84-17720
RUSSELL, D. L. N84-17952
RYMAN, D. H. N84-17825

S

SABRI, S. N84-17456
SAGALYN, R. C. N84-17281
SAGDEEV, R. Z. N84-17511
SALAS, M. D. N84-17118
N84-17119
SALDIVAR, J. T. N84-17830
SALIK, J. N84-17982
SALJE, E. N84-17416
SAMET, H. N84-17670
SAMUELS, R. N84-17220
SANDEL, F. N84-18030
SANDERS, T. H., JR. N84-17367
SANDERS, W. T. N84-18147
SANDERSON, T. K. N84-17505
N84-17506
SANDHU, S. S. N84-17303
SASAKI, J. N84-18079
SAUZAY, C. N84-17349
SAVCHENKO, A. A. N84-18053
SAVITSKIY, Y. M. N84-17361
SAWKA, M. N. N84-17826
SAWKO, P. M. N84-17250
SCAGLIONE, P. H. N84-17831
SCANLAN, R. M. N84-18012
SCANLON, C. N84-17165
SCHADE, J. H. N84-17465
N84-17466
SCHAFFNER, P. R. N84-17784
SCHARTEL, W. A. N84-17248
SCHEURLE, J. N84-17958
SCHICHTLE, C. N84-17197
SCHIFF, L. B. N84-17141
SCHISSEL, P. N84-17402
SCHLIFKOWITZ, U. N84-17915
SCHLUDE, F. N84-17655
N84-17667
SCHLUETER, W. N84-17645
N84-17646
N84-17647
N84-17648
SCHMELTZ, E. J. N84-17787
SCHMIDT, D. K. N84-17172
SCHMIDT, R. N84-17271
SCHNITZLER, A. D. N84-17561
SCHOENWETTER, H. K. N84-17570
SCHOOF, R. J. N84-18002
SCHRAMM, S. W. N84-17558
SCHREMPP, W. N84-17285
SCHROEDER, L. C. N84-17784
SCHUBERT, F. H. N84-17855
N84-17856
N84-17857
SCHUBERT, S. D. N84-17716
SCHULSON, E. M. N84-17631
SCHWAB, J. R. N84-17142
SCHWAKE, A. N84-18138
SCHWARTZ, F. K. N84-17777
SCHWARZ, R. B. N84-17369
SCHWEIN, T. F. N84-17776
SCHWENN, R. N84-18149
SCKOPKE, N. N84-17720
SEELHORST, C. N84-17285
SEEMAN, G. N84-17187
SEHANOBISH, K. N84-17399
SETSER, D. W. N84-17310
SETTLE, M. N84-17651
SEVESTRE, C. N84-18013
N84-18014
SHACK, W. J. N84-17378
SHAFFER, W. A. N84-17730
N84-18046
SHALIMOV, S. L. N84-17715
SHANAHAN, D. F. N84-17860
SHANNON, J. D. N84-17701
SHAPIRO, V. D. N84-17511
SHAPOVAL, V. I. N84-17338
SHARMA, V. N84-17365
SHARP, W. M. N84-18057
SHAW, D. M. N84-18074
SHAW, J. H. N84-18046
SHAWHAN, S. D. N84-17265
N84-17276
SHE, C. Y. N84-17735
SHEIH, C. M. N84-17699
SHEMER, L. N84-17943
SHENOY, G. K. N84-18078
SHEPHERD, K. P. N84-18017
SHERIDAN, T. B. N84-17838
SHERIF, T. S. N84-18082
SHIELDS, S. E. N84-17180
SHIPE, J. A. N84-17205
SHIRLEY, D. A. N84-18080
SHIRTZ, J. J. N84-17411
SHOTT, J. N84-17494
SHOWELL, M. S. N84-17810
SHRIVER, D. F. N84-17305
SHTEINBERG, A. S. N84-17344
SHUDDE, R. H. N84-17912
SHUMPERT, B. L. N84-17678
SHUR, M. N84-18072
SHVAYSHTEYN, Z. I. N84-17753
SIDORENKOVA, E. S. N84-17804
SIEBEL, J. E. N84-17556
SIEBER, A. J. N84-17669
SIEGFRIED, J. B. N84-17832
SIKKA, V. K. N84-17372
SILVEIRARAMOS, F. N84-17786
SIMETKOSKY, M. N84-18117
SIMMONS, A. P. N84-17161
SIMONS, R. L. N84-17368
SINCLAIR, J. E. N84-18126
SINGH, J. J. N84-17560
SIOL, R. N84-17765
SKOP, R. A. N84-17968
SLAVIN, S. E. N84-17346
SLEMROD, M. N84-17537
SLIWA, S. M. N84-17185
SLOWEY, J. W. N84-17733
SMIRNOV, L. A. N84-17513
SMITH, B. N84-17922
SMITH, D. B. N84-17173
N84-17174
SMITH, G. N84-18117

SMITH, G. A. N84-17194
SMITH, J. S. N84-18035
SMITH, L. N. N84-18074
SMITH, R. N84-17608
SMITH, S. D. N84-17806
SMITH, S. W. N84-17497
SMITH, W. L. N84-17772
SMYRE, J. L. N84-17678
SOEDERQVIST, R. N84-18025
SOEDERQVIST, S. N84-18025
SOKOLOV, A. Y. N84-17511
SOMMER, T. M. N84-17861
SONNERUP, B. U. O. N84-17718
N84-17719
N84-17720
SOUTER, K. N84-17187
SOVEN, P. N84-17331
SPALDING, J. D. N84-18140
SPALVINS, T. N84-17351
N84-17352
SPARLIN, D. M. N84-18076
SPENCE, H. N84-17731
SPENCER, R. N84-17689
SPERATO, M. N84-18103
SPRANGLE, P. N84-17583
SPUR, G. N84-17419
SQUIRE, V. A. N84-17683
SRINIVASAN, G. R. N84-17150
SRIVASTAV, R. P. N84-17965
SRIVASTAVA, R. D. N84-17398
SRYVALIN, I. T. N84-17343
ST.LAWRENCE, W. F. N84-17631
STAHLE, C. V., JR. N84-17230
STALLARD, B. W. N84-17568
N84-18062
STALLINGS, R. L., JR. N84-17134
STANLEY, R. J. N84-17800
STANNARD, P. R. N84-17268
STAPELMANN, J. N84-17423
N84-17424
STARK, Y. S. N84-17344
STEELE, F. K. N84-17475
STEENMEYER, A. N84-17786
STEFANAKOS, E. K. N84-18070
STEIN, M. N84-17390
STEPHAN, K. D. N84-17443
STEPHEN, J. H. N84-17505
N84-17506
STERN, T. G. N84-17224
STEVENS, D. E. N84-17726
STIASSNIE, M. N84-17943
STOEGER, R. N84-17646
STOKES, C. W., III N84-17154
N84-17155
STOKHOLM, M. N84-17264
STOMMEL, H. M. N84-17800
STONE, N. N84-17265
STONE, T. A. N84-17680
STOUGHTON, J. W. N84-17195
STRAEMKE, S. N84-17335
STRANGE, W. E. N84-17750
STRAZISAR, A. J. N84-17143
STREUFERT, S. N84-17843
N84-17846
STREUFERT, S. C. N84-17844
N84-17846
STRIFORS, H. C. N84-17634
STROEKER, R. J. N84-18004
STRONACH, C. E. N84-18067
STUTE, M. N84-17183
SU, Y. T. N84-17431
SUBRAMANIAN, S. V. N84-17437
SULZBACHER, G. N84-17183
SUME, A. N84-17918
SUMNER, J. S. N84-17684
SUN, W. J. N84-17397
SUNKEL, W. E. N84-17925
SUOMI, V. E. N84-17773
SUPERCZYNSKI, M. J. N84-18009
SUTHERLAND, G. N84-17914
SUTTON, G. N84-17689
SVE, C. N84-17359
SVENDSEN, E. N84-17664
SWANK, J. H. N84-18123
SWANK, L. R. N84-17400
SWEENEY, D. W. N84-17568
N84-18062
SWIFTE, R. H. D. N84-18125
SWYT, D. A. N84-17324
SZEKELY, A. N84-17317

T

TAFF, L. G. N84-18139
TANG, C. M. N84-17583
TANG, J. S. N84-17732
TANG, L. N84-17967
TANG, R. N84-17619
TANKERSLY, B. C. N84-17232
TARBELL, S. A. N84-17796
TAUTZ, M. F. N84-17268
TAWIL, V. N84-17470
TAYLOR, R. J. N84-17834
TELLEFSEN, M. N84-17357
TERIELE, H. J. J. N84-17996
N84-18005
N84-18006
TETERS, L. R. N84-17468
THANING, L. N84-17741
THIO, Y. C. N84-17482
THOLEN, A. D. N84-17425
THOMAS, J. M. N84-17615
N84-17622
TICE, A. R. N84-17671
TIEMANN, W. N84-17797
TIENFENBACHER, E. N84-17183
TIETZ, J. C. N84-17249
TIJDEMAN, R. N84-17990
N84-17999
N84-18004
TILLEY, D. M. N84-17287
TIPTON, S. L. N84-17240
TIWARI, S. N. N84-17437
TOBAK, M. N84-17137
N84-17141
TOFFALES, C. N84-17559
TOKOVOI, O. K. N84-18064
TOKSOZ, M. N. N84-17738
TOLLE, F. F. N84-17157
TOLSTOGUZOV, N. V. N84-17342
TOMKO, J. J. N84-17590
TOMKO, R. P. N84-17688
TOPPLER, J. F. N84-17786
TORBERT, R. B. N84-17252
N84-17258
TORGE, W. N84-17681
TOWNSEND, L. W. N84-18044
TRAD, L. A. N84-17826
TREMILLON, B. N84-17298
N84-17299
TREUDEN, M. L. N84-18008
TREW, R. J. N84-17490
TREYTL, D. N84-17462
TRICKEY, H. W. N84-17688
TRIJONIS, J. N84-17714
TRUJILLO, B. M. N84-17250
TRUTT, F. C. N84-17865
N84-17866
N84-17867
N84-17868
TSANG, C. S. N84-17431
TSELIS, A. C. N84-18065
TU, S. N84-17429
TUCKER, R. H. N84-18125
TURK, J. W. M. N84-17992
TURKO, B. T. N84-18022

U

ULABY, F. T. N84-17642
N84-17673
ULITCHNY, M. G. N84-17382
ULLMAN, J. D. N84-17494
N84-17888
UMARJI, A. M. N84-18078
USHAKOV, V. K. N84-17414
UZUNJAN, M. D. N84-17418

V

VAHRENKAMP, R. N84-17890
VAINSHTEIN, A. A. N84-17613
VAISBERG, O. L. N84-17511
VAKHOBOV, A. V. N84-17343
VALENTIAN, D. N84-17285
VALENTIN, F. N84-17552
VALIANT, L. G. N84-17875
VANDELUNE, J. N84-18005
N84-18006
VANDERDUYNSCHOUTEN, F. A. N84-17940
VANDERHOFF, J. A. N84-17579
VANDERLINDEN, F. J. N84-18000
VANDERVEEN, C. N84-17635
VANDEURSEN, H. N84-17474
VANDEVENDER, J. P. N84-18061
VANDUREN, H. N84-17706
VANEK, J. N84-17744
VANEMDEBOAS, P. N84-17991
VANLEEUWEN, E. H. N84-17524
VANLEEUWEN, J. N84-17873
N84-17874
N84-17877
N84-17879
VANZYL, J. M. N84-17981
VARDI, M. Y. N84-17887
N84-17902
VARDI, Y. N84-17944
VARNEY, A. M. N84-17312
VASERINA, K. N. N84-17476
VEATCH, M. N84-17686
VEGH, E. N84-17453
VELASCO, F. R. D. N84-18100
VENKATAPTHY, E. N84-17936
VENTURINI, E. L. N84-18075
VENURU, C. S. N84-17437
VERBER, C. M. N84-18047
VERGHESE, G. C. N84-17949
VERRILLI, M. J. N84-17350
VESELOVSKII, V. I. N84-17336
VIALET, C. N84-17507
N84-17508
VICROY, D. D. N84-17165
VIDYASAGAR, M. N84-17949
VIGERON, F. R. N84-17237
VILLEFRANCHE, P. N84-17282
VIOLETTE, E. J. N84-17473
VITEK, J. M. N84-17377
VOGEL, P. N84-17410
VONBAEYER, H. C. N84-17478
VOORHOEVE, M. N84-17904
VREELAND, T., JR. N84-17369

W

WADA, B. K. N84-17233
WADHAMS, P. N84-17737
WAHRER, D. J. N84-17543
WALCK, M. C. N84-17723
WALKO, L. C. N84-17153
WALSH, T. H. N84-17182
WALTMAN, D. J. N84-18009
WALTON, J. R. N84-17624
WAMPLER, E. J. N84-18120
WANCHOO, S. N84-17247
WANG, P. S. N84-17412
N84-17413
WARNER, H. D. N84-17191
WARNLOF, O. K. N84-17572
WATERMAN, A. N84-17442
WEAVER, J. H. N84-17358
WEAVER, W. R. N84-17575
WEBB, J. N84-18089
WEBB, K. N84-17444
WEBER, E. N84-17704
WEEKS, W. F. N84-17798
WEIGEL, P. H. N84-17833
WEIKERT, C. N84-17847
N84-17848
N84-17849
WEINERT, H. L. N84-17496
WEINSCHEL, H. D. N84-17442
WEISS, J. N84-17395
WEISSHAAR, T. A. N84-17172
WEISSMAN, D. E. N84-17441
WEITZ, R. L. N84-17295
WELCH, C. T. N84-17287
WENZEL, H. G. N84-17681
WERNER, C. N84-17169
WESTLEY, F. N84-17325
WETZEL, P. A. N84-17828
WHALEY, P. W. N84-17628
WHIPPLE, E. C. N84-17252
N84-17258
N84-17270
WHITE, B. L. N84-17296
WHITE, C. W. N84-17403
WHITE, D. H. N84-18037
WHITE, R. K. N84-17780
WHITE, W. A. N84-17483
WHITMORE, B. C. N84-17360
WHITNEY, R. R. N84-18039
WIBERLEY, S. E. N84-17293
WIEDERSICH, H. N84-17380
WILCOX, C. J. N84-17782
WILDERMUTH, P. F. N84-17173
N84-17174
WILHELMI, H. N84-17335
WILKINS, R. L. N84-17580
WILLEMS, G. C. N84-17562
WILLERMET, P. A. N84-17594
WILLIAMS, H. E. N84-17492
WILLIAMS, J. M. N84-17403
WILLMOTT, C. J. N84-17729
WILLSKY, A. S. N84-17949
N84-17988

WILSON, A. F. N84-17850
WILSON, J. W. N84-17575
N84-18044
WILSON, P. N84-17649
WILSON, R. M. N84-18141
WINTER, D. T. N84-18006
WINTER, R. N84-17656
WINTER, S. N84-17707
WINTER, W. G. N84-17806
WISIAN-NEILSON, P. N84-17392
WITTEVEEN, J. N84-17635
WITTING, J. M. N84-17964
WOLD, A. N84-17357
WOLF, D. N84-17375
WOLFER, W. G. N84-17379
WOLFSON, M. G. N84-17406
WONG, Y. S. N84-17966
WOOD, C. N84-17388
WOOD, V. E. N84-18047
WOODS, A. N84-17233
WOODWELL, G. M. N84-17680
WOYCZYNSKI, W. A. N84-17959
WREKSOMINDOJO, E. S. N84-18108
WRENN, G. N84-17256
N84-17262
N84-17263
WU, K. Y. N84-17428
WU, L. K. N84-17642
WUEBBLES, D. J. N84-17754
WYLIE, D. P. N84-17773
WYMAN, E. W. N84-17568

X

XIAO-PING, Z. N84-17751
XIE, Z. M. N84-17392

Y

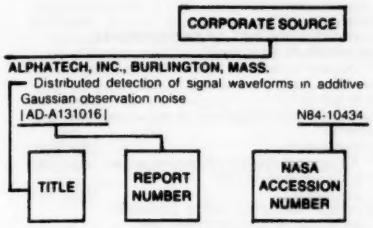
YAHSI, O. S. N84-17617
N84-17618
YAMAMOTO, S. N84-18109
YANEY, P. P. N84-17544
YANG, L. C. N84-17555
YAO, Y. C. N84-17440
N84-17983
YAROS, S. F. N84-17132
YEE, B. G. W. N84-17623
YEFIMOV, Y. V. N84-17361
YEGOSHKINA, L. A. N84-18010
YEH, H. C. N84-17389
YELYUTIN, A. V. N84-18053
YIREN, Y. N84-17967
YOKEL, R. A. N84-17809
YONGKUI, Z. N84-17362
YOON, Y. H. N84-17515
YOST, F. G. N84-17371
YOUNG, C. E. N84-18040
YOUNG, D. T. N84-17272
YOUNG, L. R. N84-17828
YOUNG, R. S. N84-18092
YU, P. K. L. N84-17573
YU, S. S. N84-18057
YUAN, S. W. K. N84-17527
YUHUA, S. N84-17967

Z

ZABIELSKI, M. F. N84-17333
ZABLOTSKY, G. A. N84-17752
ZACHARIAS, F. N84-17302
ZANG, T. A. N84-17118
N84-17119
ZANTEMA, H. N84-18001
ZAPOTOSKY, J. E. N84-17445
ZASTENKER, G. N. N84-17511
ZAUTNER, J. H. N84-17759
ZBASHNIK, J. P. N84-18012
ZEEDERBERG, T. D. N84-17601
ZEEVI, Y. Y. N84-17828
ZIMCIK, D. G. N84-17237
ZIMMER, J. E. N84-17295
ZIMMERMAN, R. E. N84-17176
ZINDO, M. N84-17594
ZIOMEK, L. J. N84-18021
ZUCCA, R. N84-17890
ZUCKER, J. I. N84-17881
ZUKHURTDINOV, M. A. N84-17343
ZWETSLOOT, P. A. J. N84-17789

CORPORATE SOURCE INDEX

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ABERDEEN UNIV. (SCOTLAND).
Northeast Scotland coastal field guide and geographical essays
[AD-A134861] N84-17674

ACADEMY OF SCIENCES (USSR), MOSCOW.
Effects of small-scale plasma disturbance on the IKB-1300 spacecraft potential
[PR-839] N84-17208
Electron acceleration in the front of intense collisionless shock waves
[PR-813] N84-17511
Auroral ion acceleration
[PR-783] N84-17715
Belt of life in the galaxy
[PR-761] N84-18127
Proposals for VIRA (Venus International Reference Atmosphere): Chemical composition of atmosphere below 100 km
[PR-830] N84-18134
Proposals for VIRA (Venus International Reference Atmosphere): Solar and thermal radiation
[PR-829] N84-18135

ACUREX CORP., MOUNTAIN VIEW, CALIF.
Disclinations in carbon-carbon composites
[AD-A135248] N84-17295
Linear Fresnel lens photovoltaic concentrator program
[DE84-002971] N84-17689

AEG-TELEFUNKEN, WEDEL (WEST GERMANY).
Development of technologies for very thin solar cells
[BMFT-FB-W-83-024] N84-17694
Development or a solar cell coverglass adhesive for space application
[BMFT-FB-W-83-029] N84-17695

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
Calculation of the aerodynamic flow field in the vicinity of a Sea King helicopter
[ARL-AERO-REPT-158] N84-17128

AEROSPACE CORP., EL SEGUNDO, CALIF.
A technique for the nondestructive detection of voids and composition anomalies in metal matrix composite wires using X or gamma rays
[AD-A135481] N84-17359
Measurements of hypergolic fuels' and oxidants' permeation through commercial protective materials: Part 1. Inhibited red fuming nitric acid and unsymmetrical dimethylhydrazine
[AD-A134714] N84-17411
Modeling study of a CW HF resonance transfer laser medium
[AD-A134866] N84-17580

AEROSPACE CORP., LOS ANGELES, CALIF.
A review of SCATHA satellite results: Charging and discharging N84-17254

AGRICULTURAL RESEARCH SERVICE, BELTSVILLE, MD.
Comparison of the information content of data from the LANDSAT 4 Thematic Mapper and the multispectral scanner
[E84-10081] N84-17641

AIR FORCE ACADEMY, COLO.
Air Force Academy Aeronautics Digest - Fall/Winter 1982
[AD-A135073] N84-17145
Proceedings of the Symposium on Military Space Communications and Operations
[AD-A135021] N84-17439

AIR FORCE ARMAMENT LAB., EGLIN AFB, FLA.
Project DELUGE: The development of a Holloman high speed test track heavy rainfield
[AD-A134810] N84-17205
Project DELUGE: A proposed mathematical model for the Holloman AFB test track simulated rainfield
[AD-A134891] N84-17207

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB, MASS.
The concepts of critical temperature and energy cutoff of ambient electrons in high voltage charging of spacecraft N84-17275
Proceedings of the Air Force Geophysics Laboratory Workshop on Natural Charging of Large Space Structures in Near Earth Polar Orbit
[AD-A134894] N84-17281

AIR FORCE GLOBAL WEATHER CENTRAL, OFFUTT AFB, NEBRASKA.
Cloud forecast fields comparison test
[AD-A135556] N84-17761

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Estimating the cost of composite material airframes using the Rand Corporation Development and Procurement Costs of Aircraft parametric model (DAPCA III)
[AD-A134993] N84-17120
Preventive maintenance on space systems
[AD-A134955] N84-17198
An investigation of non-extravehicular activity (Non-EVA) on-orbit maintenance support concepts for orbiting systems
[AD-A134957] N84-17199
Photochemical energy storage (photosensitized isomerization of norbornadiene to quadricyclane by copper (I) complexes)
[AD-A135363] N84-17687
Kinetic energy in the northern hemisphere during the FGGE (First GARP Global Experiment) year
[AD-A135382] N84-17759
Possible tidal modulation of the Indian monsoon onset
[AD-A135441] N84-17760
Analysis of the pilot conversion process for the Air Force T-46A jet trainer aircraft
[AD-A134404] N84-17845
A reliability and failure mode analysis of celestial training device microcomputers employed by SAC and MAC
[AD-A135003] N84-17885
Selection of noisy sensors and actuators for regulation of linear systems
[AD-A135442] N84-17931
Derivations of a prime ring which satisfy a polynomial identity
[AD-A135435] N84-17963
An approach to the design of a management information system: Development procedure for the Indonesian defense logistics staff
[AD-A134974] N84-18108

AIR FORCE OCCUPATIONAL AND ENVIRONMENTAL HEALTH LAB., BROOKS AFB, TEX.
Rationale for a Threshold Limit Value (TLV)R for JP-4/Jet B wide cut aviation turbine fuel
[AD-A134814] N84-17827

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Re-entry and simulation
[AD-A135515] N84-17201
The oceangoing space survey ship, the Wang Yuan
[AD-A135514] N84-17204
The question of optimization of three-dimensional maneuver of orbital apparatus in the atmosphere
[AD-A134753] N84-17280
Constitution diagram of system vanadium - copper
[AD-A135516] N84-17361
An evaluation of overload retardation behavior and overload retardation models of Ti-6Al-4V sheet titanium alloy
[AD-A135548] N84-17362
An investigation of the thermodegradation of ablative organic silicon resin
[AD-A135546] N84-17397
Journal on Numerical Methods and Computer Applications (selected articles)
[AD-A134752] N84-17967
Form coefficient for the field of a superconducting synchronous machine
[AD-A134751] N84-18010
Calculating the magnetic field from a saddle-shaped coil without a ferromagnetic circuit
[AD-A134776] N84-18011
Linear inductive accelerator
[AD-A135547] N84-18029
Chinese journal of infrared research (Selected articles)
[AD-A135504] N84-18051
A program for developing automated scientific-information processing in maritime economy
[AD-A135518] N84-18107

AIR FORCE WEAPONS LAB., KIRTLAND AFB, N. MEX.
Soil characterization and evaluation at White Sands Missile Range, New Mexico
[AD-A134820] N84-17206

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Data acquisition for evaluation of an airborne lightning detection system
[AD-A135318] N84-17153
Effects of JP-4 fuel on Graphite/Epoxy composites
[AD-A135416] N84-17296
Behavior of an aromatic heterocyclic polymer in salt solution
[AD-A134865] N84-17401
Use of small crack data to bring about and quantify improvements to aircraft structural integrity
[AD-A135012] N84-17623
Feasibility assessment of JOVIAL to Ada translation
[AD-A134857] N84-17911

ALABAMA UNIV., HUNTSVILLE.
Comparison of thermal plasma observations on SCATHA and GEOS N84-17262

AMES LAB., IOWA.
Formulae for configuration averages of products of 1-body and 2-body operators in many-fermion spaces
[DE84-002634] N84-17971

AMSTERDAM UNIV. (NETHERLANDS).
Machine models, computational complexity and number theory N84-17991
Primality testing N84-17993
The computation of Galois groups N84-18000
Class numbers and units N84-18001

ANAMET LABS., INC., SAN CARLOS, CALIF.
Evaluation of a biaxial test fixture
[AD-A134845] N84-17629

APPLIED COMBUSTION TECHNOLOGY, INC., ORLANDO, FLA.
Expanded ignition effectiveness tests of selected igniter materials with Navy propellants
[AD-A134704] N84-17312

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
Human reactions to transient electric currents, volume 8
[PB84-112895] N84-17834

ARGONNE NATIONAL LAB., ILL.
Modification of alloy surface composition by segregation processes as a means of impurity control in fusion devices
[DE84-003645] N84-17373
Segregation of Zn solutes to high-angles (001) twist grain boundaries in Al
[DE84-003455] N84-17375
Effects of nominal and crack-tip strain rate on IGSCC susceptibility in CERT tests
[DE84-004006] N84-17378
Study of ion bombardment-induced subsurface compositional modifications in Ni-Cu alloys at elevated temperatures by ion scattering spectroscopy
[DE84-003632] N84-17380
Aging degradation of cast stainless steel: Status and program
[DE84-004018] N84-17381
State-of-the-art of solid-state motor controllers. Part 4: Failure-rate and failure-mode data
[DE84-001022] N84-17502
Leakage flow-induced vibrations of reactor components N84-17611
Empirical analysis of meandering and flow characteristics in laboratory and natural channels
[DE84-003461] N84-17679
Evaluation of wind field interpolation schemes used in sturies of regional-scale pollutant transport
[DE84-003634] N84-17699
Estimation of North America anthropogenic sulfur depoeition as a function of source/receptor separation
[DE84-003638] N84-17701
Comparison of organisms and cell types using two-dimensional electrophoresis
[DE84-003574] N84-17807
Proposed second harmonic acceleration system for the intense pulsed neutron source rapid cycling synchrotron
[DE84-003601] N84-18036
Velocity and electronic state distributions of sputtered Fe atoms by laser-induced fluorescence spectroscopy
[DE84-003649] N84-18040
Preliminary tests of a second harmonic RF system for the intense pulsed neutron source synchrotron
[DE84-003505] N84-18041
Crystal fields and second order magnetic hyperfine interactions in TmFe2Si2
[DE84-003622] N84-18078
Diffusion mechanisms in transition-metal oxides
[DE84-003460] N84-18081
ARINC RESEARCH CORP., ANNAPOLIS, MD.
Automated data base implementation requirements for the avionics planning baseline, Army
[AD-A135259] N84-18103
ARIZONA STATE UNIV., TEMPE.
Human factors issues associated with the use of speech technology in the cockpit
[NASA-CR-166548] N84-17433
ARIZONA UNIV., TUCSON.
Geophysical exploration surveys for ground water in the San Pedro Basin, Arizona
[PB84-110808] N84-17684
ARIZONA WATER RESOURCES RESEARCH CENTER, TUCSON.
Geophysical exploration surveys for ground water in the San Pedro Basin, Arizona
[PB84-110808] N84-17684
ARKANSAS UNIV., FAYETTEVILLE.
Study of a pulse width modulated, telemetered, microprocessor based data acquisition system N84-17247
ARMY AERONAUTICAL RESEARCH LAB., MOFFETT FIELD, CALIF.
Impact response of an energy absorbing earcup
[AD-A134828] N84-17860
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
A functional stress intensity approach to multiply cracked, partially autofrettaged cylinders
[AD-A135345] N84-17625
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, ST. LOUIS, MO.
An airborne programmable digital to video converter
[AD-A134839] N84-17181
ARMY AVIATION SYSTEMS COMMAND, ST. LOUIS, MO.
Experimental blade vortex interaction noise characteristics of a utility helicopter at 1/4 scale
[NASA-TM-84653] N84-18018
ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
Computer models for two-dimensional transient heat conduction
[AD-A134893] N84-17549
A study on the tensile strength of ice as a function of grain size
[AD-A134889] N84-17631
Transport of water in frozen soil. I: Experimental determination of soil-water diffusivity under isothermal conditions
[AD-A135419] N84-17671
Reports of the U.S. - U.S.S.R. Weddell Polynya expedition, October-November 1981. Volume 6: Upper-air data
[AD-A134871] N84-17736
MIZEX: A program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 2: A science plan for a summer marginal ice zone experiment in the Fram Strait/Greenland sea: 1984
[AD-A134872] N84-17737
Synoptic meteorology during the SNOW-ONE-A field experiment
[AD-A134888] N84-17762
Statistical aspects of ice gouging on the Alaskan Shelf of the Beaufort Sea
[AD-A134428] N84-17798
ARMY COLD REGIONS TEST CENTER, FORT GREELY, ARK.
Arctic personnel effects
[AD-A134892] N84-17829
ARMY ENGINEER TOPOGRAPHIC LABS., FORT BELVOIR, VA.
Application of a feature selection technique to samples of high resolution synthetic aperture radar imagery
[AD-A135006] N84-17438
Evaluation of published criteria for identifying metamorphic rocks on air photos: Two case studies in the northeastern United States
[AD-A135451] N84-17672
The classifications of metamorphic rocks and their applications to air photo interpretation procedures
[AD-A134965] N84-17675
ARMY ENGINEER WATERWAYS EXPERIMENT STATION, LIVERMORE, CALIF.
Methodology for the calculation of a shallow-water wave climate
[AD-A134715] N84-17792
ARMY INTELLIGENCE AND THREAT ANALYSIS CENTER, ARLINGTON, VA.
Military Medical Journal, no. 7, 1983
[L-2456] N84-17811
Prevention of flight fatigue by physical training N84-17812
Effect of the microclimate on the night sleep and physical fitness of seamen during a cruise in the low latitudes N84-17813
Military Medical Journal, no. 2, 1983
[L-2341] N84-17814
Assessment of the functional state of the heart muscle in aircrew members by means by bicycle ergometry N84-17815
The effect of smoking on the non-specific resistance of the organism of seamen at sea N84-17816
Military Medical Journal, no. 3, 1983
[L-2399] N84-17817
Investigation of the microcirculation of the conjunctiva in airmen with the initial symptoms of cerebral atherosclerosis N84-17818
Changes in the T and B systems of immunity in seamen during a long cruise N84-17819
Military Medical Journal, no. 4, 1983
[L-2403] N84-17836
The concept of working capacity of the flight crew N84-17837
ARMY INVENTORY RESEARCH OFFICE, PHILADELPHIA, PA.
Sortie duration and helicopter component failures (an empirical study)
[AD-A134745] N84-17122
ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Flammability characteristics of some epoxy resins and composites
[AD-A135282] N84-17394
Ceramic life prediction methodology - hot spin disc life program
[AD-A134783] N84-17400
ARMY MISSILE COMMAND, REDSTONE ARSENAL, ALA.
Atmospheric scintillation at 94 GHz
[AD-A134743] N84-17452
ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND, FORT BELVOIR, VA.
Robotic technology applied to Army mobility systems
[AD-A134728] N84-17933
ARMY NATICK RESEARCH AND DEVELOPMENT COMMAND, MASS.
Reactivity of TNT and TNA-microbial reduction products with soil components
[AD-A135512] N84-17698
ARMY RESEARCH AND TECHNOLOGY LABS., CLEVELAND, OHIO.
Effects of different rub models on simulated rotor dynamics
[NASA-TP-2220] N84-17590
Hydrodynamic lubrication of rigid nonconformal contacts in combined rolling and normal motion
[NASA-TM-83578] N84-17592
ARMY RESEARCH AND TECHNOLOGY LABS., FORT EUSTIS, VA.
Friction and wear behavior of aluminum and composite airplane skins
[NASA-TP-2262] N84-17175
ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Overuse injuries of the lower extremities associated with marching, jogging and running. A review
[AD-A134672] N84-17824
Physiological responses to prolonged upper body exercise
[AD-A134811] N84-17826
Autonomic influences on peripheral circulatory and thermal responses to cold
[AD-A134444] N84-17831
ARMY TEST AND EVALUATION COMMAND, ABERDEEN PROVING GROUND, MD.
Test Operations Procedure: Signal converters
[AD-A134615] N84-17446
Test Operations Procedure (TOP): Data transmission equipment
[AD-A134711] N84-17449
ASTRO RESEARCH CORP., CARPINTERIA, CALIF.
The STEP/STACBEAM experiment technology development for very large solar array deployers N84-17220
AUSTRALIAN NATIONAL UNIV., CANBERRA.
The first 200,000,001 zeros of Riemann's zeta function N84-18006
AUTOMETRIC CORP., INC., FALLS CHURCH, VA.
APPS-4 (Analytical Photogrammetric Processing System-4) remote sensing applications guide
[AD-A134977] N84-17676
AVCO SYSTEMS DIV., WILMINGTON, MASS.
IRAAM wind tunnel test, task 3
[AD-A135256] N84-17148

B

BALL BROS. RESEARCH CORP., BOULDER, COLO.
Breadboard stellar tracker system test report
[NASA-CR-170973] N84-17166
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Thermal-energy transport from arc to rails in an arc-driven rail gun
[AD-A134991] N84-17499
Inversion of ringdown data for a rotating liquid cylinder
[AD-A134742] N84-17546
Intracavity laser excitation of NCO fluorescence in an atmospheric pressure flame
[AD-A134740] N84-17579
BATTELLE COLUMBUS LABS., OHIO.
Tie molecules in polyethylene
[PB84-101435] N84-17405
Quality assurance of heat-fused polyethylene plastic pipe joints, phase 2
[PB84-104942] N84-17608
Luneburg lens and optical matrix algebra research
[NASA-TM-172276] N84-18047
BAYER A.G., LEVERKUSEN (WEST GERMANY).
Hydrolysis of plastic wastes with the aim of recovering and reprocessing the starting components (recycling)
[BMFT-FB-T-83-199] N84-17322
BAYERISCHE AKADEMIE DER WISSENSCHAFTEN, FRANKFURT AM MAIN (WEST GERMANY).
Validation of SEASAT-1 altimetry using ground truth in the North Sea region
[SER-B-263-MITT-166] N84-17681
BDM CORP., MCLEAN, VA.
Assessment of the potential of Langmuir-Blodgett films for room temperature IR (infrared) detectors
[AD-A134616] N84-17561
BEHAVIORAL INST. FOR TECHNOLOGY AND SCIENCE, INC., WEST LAFAYETTE, IND.
A theoretical approach to measuring pilot workload
[NASA-CR-173297] N84-17859
BELL-NORTHERN RESEARCH LTD., OTTAWA (ONTARIO).
Coding of full motion color video signals at 50 kb/s
[AD-A134319] N84-17456
BENDIX CORP., KANSAS CITY, MO.
Over-aging of aluminum alloys
[DE84-004927] N84-17382

Measurement of robot accuracy using the Latin Square Three-Dimensional Ball Plate
[DE84-004920] N84-17862

BERGEN UNIV. (NORWAY).
Remote sensing of sea ice N84-17664

BOEING MILITARY AIRPLANE DEVELOPMENT, SEATTLE, WASH.
Integrated aircraft fuel tank inerting and compartment fire suppression system. Volume 2: Evaluation of nitrogen-enriched air as a fire suppressant
[AD-A134883] N84-17157

BOHAN (WALTER A.) CO., PARK RIDGE, ILL.
Navy tactical applications guide. Operational environmental satellites. Polar-orbiting satellites geostationary satellites, spacecraft, sensors, imagery
[AD-A135466] N84-17240

BOSTON UNIV., MASS.
Optical, radio and computer simulation studies of the Brazil ionospheric modification experiment of 8 September 1982
[AD-A135143] N84-17731

BRITISH AEROSPACE PUBLIC LTD. CO., BRISTOL (ENGLAND).
Developments in cabin safety and crashworthiness N84-17161

BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Experimental water tunnel with density stratification for the simulation of small-scale atmospheric flows
[BLL-RISLEY-TR-4871-(9091.9F)] N84-17188
Chemical and electrochemical properties in molten alkaline hydroxides
[BLL-RISLEY-TR-4854-(9091.9F)] N84-17298
Chemical and electrochemical properties in molten alkaline hydroxides. 3: Oxide and acid complexes of some metallic cations
[BLL-RISLEY-TR-4858-(9091.9F)] N84-17299
On the propagation laws of combustion waves in solids (pyrotechnic reactions)
[BLL-TRANS-1098-(7291.796S)] N84-17300
Adhesion studies on ion plated TiN steel
[BLL-RISLEY-TR-4880-(9091.9F)] N84-17341
The practical use of data as to the solution enthalpies of molten Fe-V-Si
[BLL-M-35430-(5828.4)] N84-17342
Study of intermetallic compounds in ternary systems Al-Ba-Nd and Al-Ba-Yb
[BLL-M-35387-(5828.4)] N84-17343
Method of high-temperature expansions in short-range order theory
[BLL-M-35385-(5828.4)] N84-17344
Deposition of polymer films on metal by the electrolysis of aqueous solutions of vinyl monomers
[BLL-LTS-1200/83-(5828.4F)] N84-17386
Influence of vibration grinding on the properties of tungsten powders and the quality of sintered pieces
[BLL-M-35373] N84-17414
Multi-transition stamping of components with thin body and tall stiffening ribs
[BLL-M-35384-(5828.4)] N84-17415
Rules governing the distribution of a gas jet in a liquid. Communication 2
[BLL-M-35437-(5828.4)] N84-17513
Distribution of unit pressures in universal spindle joint N84-17588
Optimal electric drive control to suppress jerking
[BLL-M-35391-(5828.4)] N84-17589
Stress-state index and Nadai-Lode parameter
[BLL-M-35433-(5828.4)] N84-17612
Integrated evaluation of tensile strengths and ductility limits
[BLL-M-35452-(5828.4)] N84-17613
Optimum dimensions of solid zirconium dioxide-base electrolyte in transducer of activity meter N84-18064

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Mean field theory of the linear sigma-model: Chiral solitons
[DE84-002864] N84-18034
Low energy neutrino physics
[DE84-002856] N84-18037

BROWN UNIV., PROVIDENCE, R. I.
Two-dimensional supersonic expansion flows on walls with nonequilibrium condensation N84-17125
An experimental and numerical investigation of pressure-shear waves in 6061-T6 aluminum and alpha-titanium N84-17345
Microstructural and mechanical aspects of fatigue crack initiation and growth in a 2048 aluminum alloy N84-17347
Homogeneity and magnetic susceptibility in some substituted cadmium spinels
[AD-A135297] N84-17357
Estimation techniques for transport equations
[AD-A135092] N84-17945
Estimation of temporally and spatially varying coefficients in models for insect dispersal
[AD-A135093] N84-17946
Smoothness of bounded solutions of nonlinear evolution equations
[AD-A135294] N84-17958
Photochemical generation of the optoacoustic effect
[DE84-003712] N84-18023
Elementary excitations in semiconductor superlattices structures N84-18065
Control and identification of time varying systems
[AD-A135223] N84-18091

BUNDESMINISTERIUM FUER FORSCHUNG UND TECHNOLOGIE, BONN (WEST GERMANY).
Digital sound service for direct broadcasting satellites N84-17462

BUREAU OF MINES, WASHINGTON, D. C.
Chromium
[PB84-100882] N84-17385

BUREAU OF RECLAMATION, DENVER, COLO.
Concrete tensile strength study
[PB84-101021] N84-17637

C

CALIFORNIA INST. OF TECH., PASADENA.
Shock compaction of molybdenum powder
[NASA-CR-173154] N84-17369
Interaction of weak shock waves and discrete gas inhomogeneities N84-17517
Shock wave properties of anorthosite and gabbro
[NASA-CR-173309] N84-17521
Long wavelength InGaAsP/InP lasers and optoelectronic integration N84-17573
A search for gravitational radiation from PSR 1937 + 214 N84-17717
Teleseismic array analysis of upper mantle compressional velocity structure
[NASA-CR-173285] N84-17723
Surface wave tomography
[NASA-CR-175373] N84-17728
Observations of emission in bright, low redshift quasars
[NASA-CR-175376] N84-18122
The physical nature of the continuum in active galaxies N84-18128
Turbulence and mass motion in galactic molecular clouds N84-18129
The isotopic composition of energetic particles emitted from a large solar flare N84-18140

CALIFORNIA UNIV., BERKELEY.
Crossed molecular beam studies of the reactions of oxygen and fluorine atoms
[AD-A135415] N84-17309
Fire propagation in concurrent flows
[PB84-100155] N84-17326
VLSI research
[AD-A134628] N84-17491
Nonlinear geometric, material and time dependent analysis of reinforced concrete shells with edge beams
[PB84-104454] N84-17639
Program for the analysis of fault trees
[AD-A134746] N84-17910
A Bayesian explanation of an apparent failure rate paradox
[AD-A134748] N84-17987
High resolution X- and gamma-ray spectroscopy of cosmic X-ray sources
[NASA-CR-175368] N84-18148

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Structure, inhibition and extinction of polymer diffusion flames
[PB84-101336] N84-17327
Specific heat of He-3 in the Fermi-liquid region
[DE83-014858] N84-17566
Fundamental mathematical principles for electrochemical engineering
[DE84-002181] N84-17975
Acoustic imaging of vapor bubbles through optically non-transparent media
[DE84-003961] N84-18022
Power-amplification of a heavy-ion beam in an induction linac
[DE84-002911] N84-18042
Fast diffusion of iron in single crystal rutile and iron doped rutile
[DE84-004021] N84-18079
Angle-resolved photoemission extended fine structure
[DE84-002899] N84-18080

CALIFORNIA UNIV., DAVIS.
A theoretical analysis of the past variations in global atmospheric composition and temperature structure N84-17754
Kinematics and dynamics of multi-rigid-body open-chain systems: Application to robot manipulators N84-17851

CALIFORNIA UNIV., IRVINE.
Behavioral change of blood lactate metabolism
[PB84-100171] N84-17850

CALIFORNIA UNIV., LA JOLLA.
Anomalously high potentials observed on ISEE N84-17258

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Dynamic consolidation of ceramic powders: Practicalities, problems, and prospects
[DE84-003744] N84-17404
Inexpensive solid-state trigger unit for thyratrons
[DE84-001424] N84-17501
Streak cameras for soft X-ray and optical radiation
[DE84-002780] N84-17564
Approach to real-time holography
[DE84-002779] N84-17565
Polarizing holographic reflector for Electron Cyclotron Resonant Heating (ECRH) on the Tandem Mirror Experiment Upgrade (TMX-U)
[DE84-003740] N84-17568
Radially resolved simulation of a high-gain free electron laser amplifier
[DE84-003751] N84-17585
Software maintenance on FORTRAN libraries at a large computer installation
[DE84-002008] N84-17914
Use of the Bernstein form to derive sufficient conditions for shape preserving piecewise polynomial interpolation
[DE84-003914] N84-17972
Matrix-free methods in the solution of stiff systems of ODE's
[DE84-003361] N84-17974
Ultra-high-field superconducting magnets
[DE84-003913] N84-18012
De-excitation and equipartition in H2-surface collisions
[DE84-003008] N84-18031
Comparisons of hydrodynamic beam models with kinetic treatments
[DE84-003242] N84-18057
Thresholds of Raman backscatter: Effects of collisions and Landau damping
[DE84-003736] N84-18060
Circular waveguide systems for electron-cyclotron-resonant heating of the tandem mirror experiment-upgrade
[DE84-003739] N84-18062
Insulator materials in high power lasers for inertial fusion: Present and future
[DE84-003738] N84-18063
Maximum entropy reconstruction of a volume anomaly from pulse scatter data
[DE84-002463] N84-18084

CALIFORNIA UNIV., LOS ANGELES.
Vapor-liquid phase separator studies
[NASA-CR-166545] N84-17527
Performance evaluation and control of distributed computer communication networks
[AD-A135121] N84-17928
Fusion reactors: Physics and technology
[DE83-017148] N84-18055
Research on modeling of FED/INTOR radio-frequency heating and studies of FED/INTOR impurity-control mechanisms
[DE83-016756] N84-18056
High pressure cosmochemistry applied to major planetary interiors: Experimental studies
[NASA-CR-173278] N84-18138

CALIFORNIA UNIV., SAN DIEGO.
Studies on the mechanics of rapidly flowing granular-fluid materials
[AD-A135463] N84-17540
Proceedings of the Conference on Joint Problem Solving and Microcomputers
[AD-A135001] N84-17901

CALIFORNIA UNIV., SAN DIEGO, LA JOLLA.
Anomalously high potentials observed on ISEE
[NASA-CR-172791] N84-17252

CALIFORNIA UNIV., SANTA CRUZ.
Luminosity calibration of low redshift quasars
[NASA-CR-175372] N84-18120

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Precision flexible machining cells within a manufacturing system
[AD-A134864] N84-17595
Flexible conformable clamps for a machining cell with applications to turbine blade machining
[AD-A134942] N84-17596
An optical proximity sensor for measuring surface position and orientation for robot manipulation
[AD-A134899] N84-17861
Myopic heuristics for the weighted tardiness problem on identical parallel machines
[AD-A134934] N84-17934

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Crack propagation in polystyrene under fixed elongation
[AD-A134749] N84-17399
CASTAR, INC., EVANSTON, ILL.
Fundamentals of non-Newtonian liquid flow on surfaces
[AD-A135543] N84-17541
CATHOLIC UNIV. OF AMERICA, WASHINGTON, D.C.
Auditory induction of discrete tones in signal detection tasks
[AD-A135502] N84-18019
CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE (FRANCE).
SPOT (French satellite) N84-17652
Typical SPOT data and products: Potential applications N84-17653
Remote sensing for agriculture and land use N84-17666
CENTRE OCEANOLOGIQUE DE BRETAGNE, BREST (FRANCE).
Coastal zones inventory by high resolution satellites N84-17661
CHALMERS UNIV. OF TECHNOLOGY, GOTEBORG (SWEDEN).
Dual channel water vapor radiometer system
[PB84-119445] N84-17746
CIBA-GEIGY CORP., ARDSLEY, N.Y.
Development of a stable epoxy resin system for composite repair
[AD-A135390] N84-17395
CIVIL AEROMEDICAL INST., OKLAHOMA CITY, OKLA.
The 1980 and 1981 accident experience of civil airmen with selected visual pathology
[AD-A134898] N84-17158
CLEMSON UNIV., S.C.
Use of digitized radar and microcomputers to forecast local floods and irrigation needs
[PB84-105568] N84-17767
CLEVELAND STATE UNIV., OHIO.
Consolidation of Si3N4 without additives (by hot isostatic pressing)
[NASA-CR-173279] N84-17389
Preliminary investigation of an electrical network model for ultrasonic scattering
[NASA-CR-3770] N84-17606
COAST GUARD, WASHINGTON, D.C.
Report of the International Ice Patrol Service in the North Atlantic Ocean, season of 1981
[AD-A134791] N84-17793
COASTAL ENGINEERING RESEARCH CENTER, VICKSBURG, MISS.
Nearshore current model workshop summary
[AD-A134702] N84-17791
COLLEGE OF WILLIAM AND MARY, NEWPORT NEWS, VA.
An experimental investigation of electric flashover across solid insulators in vacuum
[NASA-CR-175379] N84-17478
The effects of blade mounted vortex generators on the noise from a MOD-2 wind turbine generator
[NASA-CR-172292] N84-18017
COLORADO STATE UNIV., FORT COLLINS.
Atmospheric planetary-wave response to external forcing
[NASA-CR-175165] N84-17726
Photon-burst correlation techniques for atmospheric crosswind measurements
[AD-A134617] N84-17735
A laboratory investigation of the reflective properties of simulated, optically thick clouds
[NASA-CR-175362] N84-17755
COLORADO UNIV., BOULDER.
Task conditions versus stable individual differences as determinants of experts' judgement policies
[AD-A134797] N84-17841
Stellar Ultraviolet Rocket Research Program
[NASA-CR-175361] N84-18119
COLUMBIA UNIV., NEW YORK.
Intrinsic adaptive mesh techniques
[NASA-CR-175375] N84-17941
Nonlinear partial differential equations and related problems of pade approximations
[AD-A135110] N84-17948
COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
Airport and aircraft safety research and technology
[GPO-26-497] N84-17152
Satellite-directed navigational guidance for aircraft
[H-REPT-98-510] N84-17164
Review of materials processing in space, 1983
[GPO-27-914] N84-17193
Space commercialization
[GPO-26-498] N84-17194
Transfer of civil meteorological satellites
[H-REPT-98-509] N84-17238
Alternative fuels for general aviation
[GPO-27-618] N84-17409
Providing comprehensive national policy dealing with national needs and objectives in the Arctic and national materials policy
[H-REPT-98-593] N84-17640
A 1983 science and technology posture hearing with Director, Office of Science and Technology Policy
[GPO-21-095] N84-18085
Research and development joint ventures
[GPO-26-312] N84-18114
Joint industry/university cooperation with federally supported research facilities
[GPO-24-902] N84-18115
National Aeronautics and Space Administration Act, 1985 N84-18116
COMMITTEE ON SPACE RESEARCH, BERNE (SWITZERLAND).
Space research in Switzerland N84-17200
COMPUTER HORIZONS, INC., CHERRY HILL, N. J.
Further delineation of the utilization of scientific literature by U.S. patents
[PB84-100734] N84-18095
Further delineation of the utilization of scientific literature by U.S. patents. Appendices A: Distribution of references contained in patents to various sources
[PB84-100742] N84-18096
CONFERENCE OF RADIATION CONTROL PROGRAM DIRECTORS, INC., ROCKVILLE, MD.
Suggested state regulations for control fo radiation. Volume 2: Nonionizing radiation, lasers
[PB84-109669] N84-17587
CONSIGLIO NAZIONALE DELLE RICERCHE, FRASCATI (ITALY).
The DC electric field in space: Direct measurements and inferences from cold plasma drifts N84-17264
Electrodynamic interactions between a tethered satellite system and the ionosphere N84-17279
CONTRAVES CORP., ZURICH (SWITZERLAND).
Study on large, ultralight long-life structures in space, phase 2C
[TM-EKR3] N84-17284
COOPER UNION, NEW YORK.
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reaction flows
[NASA-CR-175365] N84-17520
COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, PRETORIA (SOUTH AFRICA).
International Conference on Recent Developments in Specialty Steels and Hard Materials N84-17348
Heat treatment and residual austenite
[CSIR-TRANS-1704] N84-17349
Aspects of the grinding process
[CSIR-TRANS-1694] N84-17416
The use of diamond core saws in the electronics industry
[CSIR-TRANS-1702] N84-17417
Wheel efficiency in the diamond-spark erosion grinding of tungsten carbides
[CSIR-TRANS-1693] N84-17418
Dressing methods for grinding wheels made of superhard abrasive materials
[CSIR-TRANS-1700] N84-17419
On the use of diamond and cubical boron nitride abrasives in automatic honing applications
[CSIR-TRANS-1640] N84-17420
Mini-Seminar on Quality Assurance
[CSIR-TSD-0008/82] N84-17600
Quality management in procurement N84-17601
Design QA on a small batch project N84-17603
Possibility of investigation of Kimerlite pipes by superconductive geomagnetic variation measuring stations
[CSIR-TRANS-1701] N84-17724
Proceedings of the 18th International Conference on Coastal Engineering
[ISBN-0-7988-2553-7] N84-17783

D

DAEDALEAN ASSOCIATES, INC., WOODBINE, MD.
Development of a high pressure water jet for the rapid removal of concrete
[PB84-109909] N84-17426
DAIMLER-BENZ A. G., STUTTGART (WEST GERMANY).
Ceramic components for gas turbines, phase 2
[BMFT-FB-T-83-198] N84-17183
DARTMOUTH COLL., HANOVER, N.H.
Magnetopause studies using data from the ISEE mission
[NASA-CR-175208] N84-17718
Magnetic field reconnection at the magnetopause: An overview N84-17719
DAYTON UNIV., OHIO.
Aircrew training devices: Utility and utilization of advanced instructional features. Phase I: Tactical Air Command
[AD-A135052] N84-17190
Instructor station display for use in T-37 flight simulation training
[AD-A134854] N84-17191
The effects of the space environment on damping materials and damping designs on flexible structures N84-17217
Prediction of an apparent flame length in a co-axial jet diffusion flame combustor
[AD-A135088] N84-17303
Model compound studies of rigid rod aromatic heterocyclic polymer systems, the X-ray crystal structure of 2,6-diphenylbenzo (1,2-d; 5,4-d') diimidazole tetrahydrate, C2OH14N4. 4H2O, a model system for the study of polymer-water interaction in polybenzimidazoles
[AD-A135278] N84-17393
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 1: Two-dimensional laser Doppler anemometer studies of isothermal flowfield in a ducted centerbody combustor
[AD-A134691] N84-17542
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 2: Numerical predictions of isothermal flowfields in a ducted centerbody combustor
[AD-A134692] N84-17543
Laser diagnostic development and measurement and modeling of turbulent flowfields of jets and wakes. Part 3: The development of a 2-channel CW Time-Resolves Laser Raman Spectroscopy (TiLaRS) system for measurements in gas flowfields
[AD-A134693] N84-17544
DEFENCE RESEARCH ESTABLISHMENT VALCARTIER (QUEBEC).
Chemical generation and deactivation of oxygen singlet delta
[AD-A135392] N84-17308
DELAWARE UNIV., NEWARK.
A climatically-derived global soil moisture data set for use in the GLAS atmospheric circulation model seasonal cycle experiment
[NASA-CR-173269] N84-17729
DELFT HYDRAULICS LAB. (NETHERLANDS).
West breakwater, Sines (Portugal) N84-17785
West breakwater-Sines (Portugal). Overview of rehabilitation and synthesis of project N84-17786
West breakwater-Sines (Portugal): Wave climatology N84-17787
West breakwater-Sines (Portugal): Study of armor stability N84-17788
West breakwater-Sines (Portugal): New aspects of armor units N84-17789
DEPARTMENT OF COMMUNICATIONS, OTTAWA (ONTARIO).
Canadian Attitude Sensing Experimental Package (CASEP) N84-17223
Flight test of a synthetic aperture radar antenna using STEP N84-17237
DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Principal facts for gravity stations in the Nevada portion of the Kingman 1 degree by 2 degree quadrangle
[PB84-103084] N84-17749
DET NORSKE VERITAS, HOVIK.
Sea state monitoring and applications N84-17665
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).
Effects on rail transport caused by air transport supply alternatives within the Federal Republic of Germany for the year 2000
[DFVLR-MITT-83-14] N84-17160
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, GOETTINGEN (WEST GERMANY).
The Prandtl Hergesell project of a National Research Establishment for Aeronautics
[DFVLR-MITT-83-10] N84-17123
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).
Results of a slant range visibility field test in Munich-Reim
[DFVLR-MITT-83-09] N84-17169
Carrier acquisition and tracking by a COSTAS-loop with automatic frequency control
[DFVLR-FB-83-24] N84-17202
Remote sensing experiments on Spacelab and STS N84-17655
Typical remote sensing data products N84-17656
Workshop on active microwave sensor design N84-17667
Approaches to radar image interpretation N84-17669

Status for knowledge: Meteorological affected icing on aircraft in clouds
[DFVLR-MITT-83-12] N84-17763

DEVELOPMENTAL SCIENCES, INC., CITY OF INDUSTRY, CALIF.
Design of a remotely controlled hovercraft vehicle for spill reconnaissance
[PB84-124064] N84-17187

DIRECTION DE LA PREVENTION DES POLLUTIONS, NEUILLY (FRANCE).
The remote sensing of oil pollution at sea: An attempt at synthesis N84-17662

DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).
Pilot system for the purification of rinse water and for the recuperation of metals in electroplating companies. Pilot system metal recovery from waste water (RMA)
[BMFT-FB-T-83-208] N84-17323
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 1: Executive summary
[ERC-RP-200-DS-009-VOL-1] N84-17423
Concept study of an automatic ellipsoidal mirror furnace facility, prephase A. Volume 2: Technical descriptions
[ERC-RP-200-DS-009-VOL-2] N84-17424
Scatterometer System Simulator (SSS), phase 1: Definition
[ESA-CR(P)-1788] N84-17765

DRAPER (CHARLES STARK) LAB., INC., CAMBRIDGE, MASS.
Shuttle on-orbit dynamics N84-17216

DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
Simulation of natural convection in a rectangular loop using finite elements
[DE84-003477] N84-17550

DUKE UNIV., DURHAM, N. C.
Search algorithms and their implementation
[AD-A135154] N84-17953

DUNDEE UNIV. (SCOTLAND).
Applications for fisheries N84-17663

E

ELECTRONIC TECHNIQUES, INC., FORT COLLINS, COLO.
SCPP (Sierra Cooperative Pilot Project) forecasting support, volume 1
[PB84-107911] N84-17782

ELLIOTT-AUTOMATION SPACE AND ADVANCED MILITARY SYSTEMS LTD., FRIMLEY (ENGLAND).
Reducing risk in seaways N84-17163
Achievement of electromagnetic compatibility in weapon systems N84-17430
EASAMS architecture for management and control systems N84-17871
ATE, ATLAS and the microprocessor N84-17872

ENGINEERING AND ECONOMICS RESEARCH, INC., VIENNA, VA.
An Attached Payload Operations Center (APOC) at the Goddard Space Flight Center (GSFC), volume 2
[NASA-CR-175160-VOL-2] N84-17203

ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
An analysis of carbon monoxide emissions as a function of ambient temperature and vehicle parameters
[PB84-103829] N84-17599

ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
Review of the National Ambient Air Quality Standards for sulfur oxides: Assessment of scientific and technical information
[PB84-102920] N84-17711
Air pollution effects on terrestrial ecosystems
[PB84-128313] N84-17712

ERASMUS UNIV., ROTTERDAM (NETHERLANDS).
Fast arithmetic operations on numbers and polynomials N84-17992
Diophantine equations N84-18004

ESSEN UNIV. (WEST GERMANY).
Experimental investigation concerning the feasibility of electrostatic precipitators at high pressures and temperatures
[BMFT-FB-T-83-201] N84-17704

EUROPEAN SPACE AGENCY, PARIS (FRANCE).
Spacecraft/plasma interactions and their influence on field and particle measurements
[ESA-SP-198] N84-17253
Remote sensing: New satellite systems and potential applications
[ESA-SP-205] N84-17650
The first European Remote Sensing Satellite (ERS-1): Overall description, potential applications and users N84-17654
Land use inventory and statistical sampling in agriculture N84-17658

EUROPEAN SPACE RESEARCH AND TECHNOLOGY CENTER, NOORDWIJK (NETHERLANDS).
Observations of the GEOS-2 equilibrium potential and its relation to the ambient electron energy distribution N84-17256
Laboratory measurement of impact ionization N84-17271
Shot noise generated by gas impact during a cometary fly-by N84-17273
Active control of the potential of ISEE-1 by an electron gun N84-17278

F

FAILURE ANALYSIS ASSOCIATES, PALO ALTO, CALIF.
Recommendations for future research on fracture mechanics life technology
[NASA-CR-170904] N84-17615
A review of fracture mechanics life technology
[NASA-CR-170903] N84-17622

FAIRCHILD WESTON SYSTEMS, INC., SYOSSET, N.Y.
Spas color camera
[NASA-CR-171739] N84-17559

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
FAA (Federal Aviation Administration) statistical handbook of aviation: Calender year 1982
[PB84-127323] N84-17124
Semiannual report to Congress on the effectiveness of the civil aviation security program
[AD-A134860] N84-17156
The objective evaluation of aircrew protective breathing equipment. 5: Mask/goggles combinations for female crewmembers
[AD-A134912] N84-17830

FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D. C.
Analysis of technical possibilities for further sharing of the UHF television band by the land mobile services in the top ten land mobile markets
[PB84-123116] N84-17470
Implementing new technology in the land mobile radio services
[PB84-101591] N84-17472
Amplitude Compandored Sideband compared to conventional frequency modulation for VHF mobile radio: Laboratory and field testing results
[PB84-116383] N84-17474

FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
Four Phase Systems, Incorporated IV/90 Mod 2 COBOL '74 release BE07
[PB84-102706] N84-17923
Four Phase Systems, Incorporated IV/90 Mod 2 COBOL '74 release BE07.COBOL technical report
[PB84-102714] N84-17924

FLORIDA STATE UNIV., TALLAHASSEE.
Estimation for infinite dimensional Ornstein-Uhlenbeck processes
[AD-A135372] N84-17961
Research in theoretical nuclear physics
[DE84-003442] N84-18038

FLORIDA UNIV., GAINESVILLE.
Ultrastructure processing and environmental stability of advanced structural and electronic materials
[AD-A135107] N84-17391
The effect of the artificial far field boundary on a finite different approximation of the Navier-Stokes equations for a compressible fluid
[AD-A135152] N84-17536

FORD MOTOR CO., DEARBORN, MICH.
Time-temperature studies of high temperature deterioration phenomena in lubricant systems: Synthetic ester lubricants
[AD-A135464] N84-17594

FORSCHUNGSINSTITUT FUER INFORMATIONSVERARBEITUNG, KARLSRUHE (WEST GERMANY).
Standard methods for image processing. Part 4: Operating instructions for the program system
[BMVG-FBWT-83-1] N84-17915

FREIBURG UNIV. (WEST GERMANY).
Remote sensing from space for forestry purposes N84-17659

FWG ASSOCIATES, INC., TULLAHOMA, TENN.
Doppler lidar signal and turbulence study
[NASA-CR-170976] N84-17574

G

GEC MACHINES PROPRIETARY LTD. FOUNDRY (ENGLAND).
Measuring quality achievements N84-17605

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
Implications of joint NASA/DOD participation in Space Shuttle operations
[PB84-122472] N84-17286
Proposed National Technical Information Service revolving fund
[PB84-103076] N84-18097

GENERAL DYNAMICS CORP., SAN DIEGO, CALIF.
Photovoltaic concentrator pointing dynamics and plasma interaction study N84-17224

GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Investigation of articulated panel dynamics N84-17230

GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
RADC (Rome Air Development Center) DDP (Distributed Data Processing) topology evaluation
[AD-A134701] N84-17909

GENERAL ELECTRIC CO., SYRACUSE, N.Y.
Pulsed heterodyne CO2 laser/scanner system. Volume 1: Assembly report
[AD-A135059] N84-17577
Pulsed heterodyne CO2 laser/scanner system. Volume 2: Operating instructions
[AD-A135060] N84-17578

GEO-CENTERS, INC., NEWTON, MASS.
Quantitative Secondary Ion Mass Spectroscopy (SIMS)
[AD-A134195] N84-17315

GEOLOGICAL SURVEY, DENVER, COLO.
Principal facts for gravity stations in the Nevada portion of the Kingman 1 degree by 2 degree quadrangle
[PB84-103084] N84-17749

GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
Comparison of photon stimulated dissociation of gas phase, solid and chemisorbed water
[AD-A134986] N84-17314
A program of research in environmental modeling
[NASA-CR-173281] N84-17697

GEORGIA INST. OF TECH., ATLANTA.
Visual cues in the simulation of low-level flight
[AD-A135461] N84-17839
Inorganic analysis in a controlled ecological life support system
[NASA-CR-173299] N84-17852
Techniques for the inorganic analysis in a controlled ecological life support system N84-17853
Standard research materials: Feces and urine N84-17854
Notions of dependency satisfaction
[AD-A135303] N84-17902

GEORGIA UNIV., ATHENS.
Analysis and comparison of some integer factoring algorithms N84-17995

GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
The COREL and W12SC3 computer programs for supersonic wing design and analysis
[NASA-CR-3676] N84-17130

GULF AND WESTERN APPLIED SCIENCE LABS., WALTHAM, MASS.
Ion deposited carbon coatings
[AD-A135068] N84-17390

H

HAHN-MEITNER-INSTITUT FUER KERNFORSCHUNG, BERLIN (WEST GERMANY).
Regular operator approximation theory
[HMI-B-389] N84-18008

HAMBURG UNIV. (WEST GERMANY).
The celestial mechanics experiment (E 11) of HELIOS
[BMFT-FB-W-83-016] N84-18124

HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Correlation of yield stress changes in 316 stainless steel irradiated with high-energy and fission neutrons
[DE84-002115] N84-17368
Correlation of fracture toughness with tensile properties for irradiated 20% cold-worked 316 stainless steel
[DE84-003954] N84-17379

HARVARD UNIV., CAMBRIDGE, MASS.
Computer modeling of aircraft cabin fires
[PB84-101153] N84-17162
Parallel computation N84-17875
On acyclic database decompositions
[AD-A135105] N84-17887
Quantification of interference and detectability properties of visual stimuli for optimal display design
[AD-A135438] N84-18049

HELSINKI UNIV. (FINLAND).
Empirical studies of program behaviour in virtual memory
[PB84-112267] N84-17921

HERAEUS (W. C.) G.M.B.H., HANAU (WEST GERMANY).
New process for recycling of rhodium and iridium from old catalysts
[BMFT-FB-T-83-179] N84-17321
HERSHEY (MILTON S.) MEDICAL CENTER, HERSHEY, PA.
Cognition and arousal as predictors of risk taking: Effects of load and cognitive style
[AD-A134324] N84-17843
Task differences, stylistic characteristics and physiological arousal
[AD-A134335] N84-17844
Effects of load, cognitive complexity and type A on satisfaction
[AD-A134415] N84-17846
HOWARD UNIV., WASHINGTON, D. C.
Two photon excitation as a tool for atmospheric and kinetic research
[NASA-CR-175378] N84-18026
HUGHES AIRCRAFT CO., EL SEGUNDO, CALIF.
Head-Up Display (HUD) technology demonstration
[AD-A134695] N84-17180
HUGHES RESEARCH LABS., MALIBU, CALIF.
The 25 kW resonant dc/dc power converter
[NASA-CR-168273] N84-17481

I

IIT RESEARCH INST., CHICAGO, ILL.
Extremely Low Frequency (ELF) communications system ecological monitoring program: Plan and summary of 1982 progress
[AD-A135482] N84-17445
Embedded gage impact study
[NASA-CR-172227] N84-17558
ILLINOIS INST. OF TECH., CHICAGO.
Understanding transition to turbulence in shear layers
[AD-A134796] N84-17548
ILLINOIS STATE UNIV., NORMAL.
Molten salt electrochemical systems
[AD-A135108] N84-17304
ILLINOIS UNIV., URBANA.
Trailing edge flow conditions as a factor in airfoil design
[NASA-CR-173294] N84-17140
Control strategies for complex systems for use in aerospace avionics
[AD-A135072] N84-17179
Studies in fin-line antenna design for phased array applications
[AD-A135255] N84-17444
Research in aeronomy
[NASA-CR-175370] N84-17721
Algorithm for the detection and integration of highly oscillatory ordinary differential equations using a generalized unified modified divided difference representation
[DE84-003585] N84-17978
High field transport of free carriers at the Si-SiO2 interface
[AD-A135338] N84-18071
INDIANA UNIV., BLOOMINGTON.
Spectroscopy of thermal energy transport
[AD-A134670] N84-18073
INDUSTRIAL COLL. OF THE ARMED FORCES, WASHINGTON, D.C.
Identification of bottlenecks and capacity constraints in F-14, F-15, F-16, and F/A-18 aircraft production
[AD-A134629] N84-17121
INFORMATION SPECTRUM, INC., ARLINGTON, VA.
Lessons learned--advanced attack helicopter
[AD-A135521] N84-17177
INFORMATION VENTURES, INC., PHILADELPHIA, PA.
Biological Effects of Nonionizing Electromagnetic Radiation, volume 7, number 2-4, July - December 1982
[AD-A134674] N84-17805
INNSBRUCK UNIV. (AUSTRIA).
Snow and ice monitoring by microwave techniques N84-17660
INRIA, ROCQUENCOURT (FRANCE).
Design and complexity of VLSI algorithms N84-17876
INSTITUT FUER ANGEWANDTE GEODAESIE, FRANKFURT AM MAIN (WEST GERMANY).
Reports on cartography and geodesy, series 1: Original reports, number 90
[ISSN-0469-4236] N84-17643
The importance of radio interferometry for geodynamics N84-17644
Investigations of Doppler position determination following the short arc and semi short arc techniques N84-17645
Results of permanent Doppler measurements at the satellite observation station Wettzell N84-17646
Calibration measurements of Doppler receivers N84-17647
Results of the simultaneous Doppler measuring campaign HOTDOC from 29 September to 10 October 1979 N84-17648
The mobile laser ranging system and its planned use in the framework of international research on geodynamics N84-17649
INSTITUT NATIONAL DE RECHERCHE D'INFORMATIQUE ET D'AUTOMATIQUE, ROCQUENCOURT (FRANCE).
Validation methods for mathematical models of flexible satellite dynamics
[ESA-CR-(P)-1794] N84-17241
INSTITUTE FOR TELECOMMUNICATION SCIENCES, BOULDER, COLO.
The use of burst transmission to increase communication range: A feasibility study
[PB84-111400] N84-17467
Estimating the performance of telecommunication systems using the ionospheric transmission channel. Ionospheric communications analysis and prediction program user's manual
[PB84-111210] N84-17468
Climatological coefficients for rain attenuation at millimeter wavelengths
[PB84-104272] N84-17475
INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
INTAC: Digital and analog circuit test language
[INPE-2764-PRE/338] N84-17898
Model and analysis of a communication interface with distributed processing for application in a communication network by packet switching
[INPE-2773-TDL/136] N84-17926
Geography information systems project
[INPE-2782-PRE/348] N84-18100
INSTITUUT TNO VOOR BOUWMATERIALEN EN BOUWCONSTRUCTIES, DELFT (NETHERLANDS).
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635
INTERACTIVE SYSTEMS CORP., LITTLETON, COLO.
Hexagonal data base study
[AD-A135532] N84-17907
INTERMETRICS, INC., HUNTSVILLE, ALA.
IMCS reflight certification requirements and design specifications
[NASA-CR-170968] N84-17167
SEPAC: Spacelab Mission 1 report
[NASA-CR-170980] N84-17196
IOWA INST. OF HYDRAULIC RESEARCH, IOWA CITY.
Three-dimensional turbulent boundary layer on a body of revolution at incidence
[AD-A135454] N84-17539
Turbulence measurements in plane jets and plumes in crossflow
[PB84-105303] N84-17554
IOWA UNIV., IOWA CITY.
Interaction of the space shuttle orbiter with the ionospheric plasma N84-17265
Finite analytic numerical solutions of laminar and turbulent convective heat transfer for pipe flow past a cavity N84-17515
Shape optimal design and free boundary value problems N84-17516
A demand-driven, coroutine-based implementation of a nonprocedural language N84-17895
Temporal finite elements based on a minimum principle for initial value problems N84-17935

J

JAPAN ATOMIC ENERGY RESEARCH INST., TOKAI.
Effects of pulsed and/or dual ion irradiation on microstructural evolution in a Ti and Si modified Austenitic alloy
[DE84-003411] N84-17374
JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
The 55-meter-structure flight experiment N84-17233
Refractory materials for high-temperature thermoelectric energy conversion
[NASA-CR-173159] N84-17388
Apparatus and method for destructive removal of particles contained in flowing fluid
[NASA-CASE-NPO-15426-1] N84-17555
Effects of systematic errors on the mixing ratios of trace gases obtained from occulation spectra
[NASA-CR-175371] N84-18046
JOHNS HOPKINS UNIV., BALTIMORE, MD.
Analysis of an error detection scheme for parallel computations
[AD-A134819] N84-17496
Testability of interconnection structures
[AD-A135431] N84-17607
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 1
[AD-A135387] N84-17626
Acoustic emission determination of deformation mechanisms leading to failure of naval alloys, volume 2
[AD-A135388] N84-17627
Exhaust emissions from a diesel engine
[PB84-122910] N84-17713
The delineation and interpretation of the Earth's gravity field
[NASA-CR-173310] N84-17722
Biochemical indicators of thermal stress: Selected genetic and physiological parameters
[PB84-100122] N84-17808

K

KANSAS STATE UNIV., MANHATTAN.
Excited state kinetics of mercury halides and mixtures with N2 and Xe
[AD-A135432] N84-17310
KANSAS UNIV., LAWRENCE.
Focusing the parabolic antenna
[NASA-CR-173304] N84-17642
KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
Development of a thermal and structural model for a NASTRAN finite-element analysis of a hypersonic wing test structure
[NASA-CR-170413] N84-17620
Microwave dielectric constant dependence on soil tension
[AD-A134651] N84-17673
KENTRON INTERNATIONAL, INC., HAMPTON, VA.
Tests on a CAST 7 two-dimensional airfoil in a streamlining test section
[NASA-CR-172291] N84-17136
KENTUCKY UNIV., LEXINGTON.
Studies of electrically stimulated rat limb and peripheral nerve regeneration
[AD-A134358] N84-17806
Rabbit neurobehavioral toxicity from aluminum
[PB84-103266] N84-17809
Algorithms, modeling and estimation for linear systems
[AD-A135134] N84-17951

L

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY, PALISADES, N. Y.
Physical oceanography report STD data from drifting ice station Fram 1
[AD-A134244] N84-17797
LEHIGH UNIV., BETHLEHEM, PA.
A cylindrical shell with a stress-free end which contains an axial part-through or through crack
[NASA-CR-173290] N84-17617
A pressurized cylindrical shell with a fixed end which contains an axial part-through or through crack
[NASA-CR-173291] N84-17618
Transient thermal stresses in a reinforced hollow disk or cylinder containing a radial crack
[NASA-CR-173292] N84-17619
LEIDEN UNIV. (NETHERLANDS).
Quadratic fields and factorization N84-18002
LIFE SYSTEMS, INC., CLEVELAND, OHIO.
Advanced air revitalization system testing
[NASA-CR-166540] N84-17855
Static feed water electrolysis subsystem testing and component development
[NASA-CR-166539] N84-17856
Electrochemical carbon dioxide concentrator subsystem development
[NASA-CR-166538] N84-17857
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Sampling mismatch and timing jitter in pulse-Doppler radar
[AD-A134683] N84-17447
A search for Earth-crossing asteroids
[NASA-CR-175374] N84-18139
LINCOM CORP., LOS ANGELES, CALIF.
User manual of the CATSS system (version 1.0) communication analysis tool for space station
[NASA-CR-171728] N84-17431
LITTON SYSTEMS, INC., WOODLAND HILLS, CALIF.
Rubidium frequency standard study
[AD-A134713] N84-17492
LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
SSME structural dynamic model development
[NASA-CR-170960] N84-17287

LOGISTICS MANAGEMENT INST., WASHINGTON, D. C.
A strategy for improving overhead cost control
[AD-A134661] N84-18092
LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Energy distributions and yields of secondary ions and electrons emitted by GIOTTO during Halley encounter N84-17272
Equation of state of fluid NH-3 from P-V-T and ultrasound measurements to 12 kbar
[DE83-015913] N84-17316
Manual of analytical methods for radiobioassay
[DE84-003978] N84-17318
Detection of elements in biomedical fluids by laser-induced breakdown spectroscopy
[DE84-003838] N84-17319
Acquisition systems for heat transfer measurement
[DE84-003779] N84-17551
Precisely aligned internal magnetic probes for the reversed-field pinch experiment, ZT-40
[DE84-003704] N84-18058
Fourier transform and polychromator studies of the inductively coupled plasma
[DE84-003975] N84-18059
Using the surface tension to estimate the condensate density of superfluid He-4
[DE83-011325] N84-18077
Probabilistic planning and budgeting for R and D programs involving activities of high uncertainty
[DE84-002310] N84-18093
Multidomain, multirecord-type Datatrieve-11 databases
[DE84-001707] N84-18110
Stability of the low degree 5 minute solar oscillations
[DE84-003786] N84-18143
LOWELL UNIV., MASS.
Automatic real time ionogram scaler with true height analysis - artist
[AD-A135174] N84-17732

M

MADRID UNIV. (SPAIN).
Study on optimal tracking strategy
[GMV-211/83] N84-17243
MANAGEMENT AND TECHNICAL SERVICES CO., HOUSTON, TEX.
Energy balance and the composition of weight loss during prolonged space flight
[NASA-CR-171745] N84-17820
Water immersion and its computer simulation as analogs of weightlessness
[NASA-CR-171746] N84-17821
MARINE BIOLOGICAL LAB., WOODS HOLE, MASS.
Test of the use of LANDSAT imagery to detect changes in the area of forest in the tropics
[DE84-004444] N84-17680
MARINE RESEARCH INST., HELSINKI (FINLAND).
Investigation of ice dynamics in the marginal ice zone
[AD-A134599] N84-17799
MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Technology needs of advanced Earth observation spacecraft
[NASA-CR-3698] N84-17248
Power subsystem automation study
[NASA-CR-170974] N84-17686
MARTIN MARIETTA CORP., DENVER, COLO.
Development of an autonomous video rendezvous and docking system, phase 3
[NASA-CR-170969] N84-17249
MARYLAND UNIV., COLLEGE PARK.
Application of hierarchical data structures to geographical information systems
[AD-A134999] N84-17670
Beam front accelerators
[DE84-003709] N84-18032
Theory of image analysis and recognition
[AD-A135453] N84-18106
Formation of dust lanes in spiral galaxies by radiation pressure N84-18130
MASCHINENFABRIK AUGSBURG-NUERNBERG A.G., MUNICH (WEST GERMANY).
Support development program for the qualification of solar farm collectors
[BMFT-FB-T-83-207] N84-17696
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
General requirements for Shuttle flight experiments N84-17221
Charging effects observed on Voyager 1 near Jupiter N84-17260
Nyquist frequency
[AD-A135023] N84-17440
A catalogue of spreading modulation spectra
[AD-A134850] N84-17454
Basic and applied research in the field of electronics and communications
[AD-A135283] N84-17487
Research Laboratory of Electronics
[AD-A135319] N84-17488
RLE (Research Laboratory of Electronics)
[AD-A134812] N84-17495
Computation of potential flows with embedded vortex rings and applications to helicopter rotor wakes
[NASA-CR-166542] N84-17526
Development of ultrasonic modeling techniques for the study of crustal inhomogeneities
[AD-A134501] N84-17738
Acoustic data and uncertainty in geotechnical site characterization offshore
[PB84-100908] N84-17801
Temporal aspects of eye movement when viewing multiple targets
[AD-A134853] N84-17828
Automation, supervisory control and workload in flight management
[NASA-CR-166474] N84-17838
Maximum likelihood reconstruction in emission tomography with time-of-flight information: A limited study
[AD-A135061] N84-17944
An algebraic approach to analysis and control of time-scales
[AD-A135115] N84-17949
Linear and nonlinear filtering and related inverse scattering problems
[AD-A135175] N84-17954
Noise
[AD-A135066] N84-17983
Detection of abrupt changes in dynamic systems
[NASA-CR-173217] N84-17988
A cooperative program to stimulate student involvement through the MIT Undergraduate Research Opportunity Program
[NASA-CR-173300] N84-18086
Hot wire in low Reynolds number flow N84-18087
Flow behavior in the Wright Brothers Facility
[WBWT-TR-1187] N84-18088
Adaptation of two-dimensional transonic analysis code, TSFOIL, for use in modeling adaptive wall test sections N84-18089
Calculating C-grids with fine and embedded mesh regions
[CFDL-TR-83-7] N84-18090
MASSACHUSETTS UNIV., AMHERST.
A model for ordinal filtering of digital images
[AD-A134705] N84-18052
MATERIALS RESEARCH LABS., MELBOURNE (AUSTRALIA).
Concentration of sulphuric acid: Premature failure of Bamag pots
[MRL-R-885] N84-17301
Cyclic voltammetry of polysulfide (Thiokol) prepolymers and related compounds
[MRL-R-911] N84-17387
The MRL small scale gap test for the assessment of shock sensitivity of high explosives
[MRL-R-896] N84-17408
Experimental electromagnetic launchers at MRL
[MRL-R-894] N84-17482
Large amplitude waves generated by an explosive mechanism
[MRL-R-905] N84-17524
Improvements to high speed rotating prism cameras including on board timing and event pulse generators
[MRL-TN-476] N84-17557
The response of rats to cutaneous dosing with trichothecene mycotoxins
[MRL-R-902] N84-17803
MATHEMATISCH CENTRUM, AMSTERDAM (NETHERLANDS).
Foundations of computer science 4. Distributed systems. Part 1: Algorithms and complexity
[MATH-CENTRE-TRACTS-158-PT-1] N84-17873
Foundations of computer science 4. Distributed systems. Part 2: Semantics and logic
[MATH-CENTRE-TRACTS-159-PT-2] N84-17879
Processes and the denotational semantics of concurrency N84-17881
Eisenstein series on the metaplectic group: An algebraic approach
[MATH-CENTRE-TRACTS-161] N84-17937
Abstract automath
[MATH-CENTRE-TRACTS-160] N84-17938
Tests for preference
[MATH-CENTRE-TRACTS-162] N84-17939
Markov decision processes with continuous time parameter
[MATH-CENTRE-TRACTS-164] N84-17940
The covariant classification of two-dimensional smooth commutative formal groups over an algebraically closed field of positive characteristic
[MATH-CENTRE-TRACTS-157] N84-17989
Computational methods in number theory, part 1
[MATH-CENTRE-TRACTS-154-PT-1] N84-17990
Perfect numbers and aliquot sequences N84-17996
On a secure public-key cryptosystem N84-17997
Factorization of polynomials N84-17998
Computational methods in number theory, part 2
[MATH-CENTRE-TRACTS-155-PT-2] N84-17999
Numerical computation of special zeros of partial sums of Riemann's zeta function N84-18005
Query processing and data allocation in distributed database systems
[MATH-CENTRE-TRACTS-156] N84-18101
MATRA SERVICE AERODYNAMIQUE, TOULOUSE (FRANCE).
Preparation of standard electrical testability provisions for space equipment. Volume 1: Executive summary
[DM.51/CV/JP/327.83-VOL-1] N84-17507
Preparation of standard electrical provisions for space equipments
[DM.51/CV/JP/327.83-VOL-2] N84-17508
MAX-PLANCK-INSTITUT FUER AERONOMIE, KATLENBURG-LINDAU (WEST GERMANY).
A dawn to dusk electric field in the Jovian magnetosphere
[NASA-CR-166463] N84-18136
MAX-PLANCK-INSTITUT FUER EXTRATERRESTRISCHE PHYSIK, GARCHING (WEST GERMANY).
Influence of wake and photoemission on electric field measurements with a double probe on GEOS-2 N84-17261
ISEE observations of magnetopause reconnection: The energy balance N84-17720
MAX-PLANCK-INSTITUT FUER PHYSIK UND ASTROPHYSIK, GARCHING (WEST GERMANY).
ROSAT-FI design review
[MPE-39] N84-17209
MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON BEACH, CALIF.
STEP flight experiments Large Deployable Reflector (LDR) telescope N84-17231
MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
Automotive Stirling engine development program
[NASA-CR-168205] N84-18117
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
Study of Attitude Control and Guidance System (ACGS) for orbit change stage
[ESA-CR(P)-1797] N84-17285
METAALINSTITUT TNO, APELDOORN (NETHERLANDS).
Study of the lubrication mechanism of thin film lubricated concentrated steel contacts. The influence of pre-treatment of the steel on the load carrying capacity
[AD-A135067] N84-17593
METEOROLOGICAL OFFICE, LONDON (ENGLAND).
Baroclinic inertial instability in the non-static equilibrium atmosphere
[BLL-TRANS-1568-(9022.552)] N84-17751
Estimation of parameters of spray clouds
[BLL-TRANS-1571-(9022.552)] N84-17752
Some parameters characterising the icing of ships from spray
[BLL-MO-TRANS-1570-(9022.552)] N84-17753
MICHIGAN STATE UNIV., EAST LANSING.
Some topics in finite elasticity N84-17614
The effect of locus of control on performance with man-machine dialogues N84-18098
MICHIGAN UNIV., ANN ARBOR.
Optimum design of millimeter-wave impatt diode oscillators
[AD-A135335] N84-17489
Dynamic behavior of nonuniform tire/wheel assemblies
[PB84-125541] N84-17598
Applications of Non-Self-Adjoint operator theory to the Singularity Expansion Method (SEM) and to the Eigenmode Expansion Method (EEM) in acoustic and electromagnetic problems
[AD-A135177] N84-17955
MIDWEST RESEARCH INST., GOLDEN, COLO.
Polymeric glazings
[DE84-000016] N84-17402
Advanced photovoltaic system simulator to demonstrate the performance of advanced photovoltaic cells and devices
[DE83-009405] N84-17688
MINNESOTA UNIV., MINNEAPOLIS.
Deterministic chaos in materials exhibiting phase transitions
[AD-A135172] N84-17537
Electron ballistic effects in III-V semiconductors
[AD-A135353] N84-18072

MISSION RESEARCH CORP., ALEXANDRIA, VA.
Numerical simulations of the NRL collective particle accelerator
[AD-A135533] N84-18028
MISSISSIPPI STATE HIGHWAY DEPT., JACKSON.
Evaluation of Chem-Crete high strength modified asphalt concentrate
[PB84-105089] N84-17636
MISSOURI UNIV., ROLLA.
Characterization of high temperature electrically conducting oxides
[DE84-002887] N84-18076
MITRE CORP., BEDFORD, MASS.
Jam-resistant speech encoding
[AD-A134707] N84-17448
HQ AFSC selection of a microprocessor development system
[AD-A134930] N84-17691
MONSANTO RESEARCH CORP., MIAMISBURG, OHIO.
Eddy current thickness gauge for reel-to-reel tape processes
[DE84-004050] N84-17567
MOUND LAB., MIAMISBURG, OHIO.
Surface compatibility studies of potassium perchlorate reaction with pyrotechnic fuels
[DE84-002829] N84-17412
Potassium perchlorate reaction with pyrotechnic fuels
[DE84-002840] N84-17413

N

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Ocean research for understanding climatic variations: Priorities and goals for the 1980's
[PB84-105816] N84-17768
Evaluation of the FEMA (Federal Emergency Management Agency) model for estimating potential coastal flooding from hurricanes and its application to Lee County, Florida
[PB84-105832] N84-17769
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical engineering. A continuing bibliography with indexes, supplement 169, January 1984
[NASA-SP-7037(169)] N84-17117
A new dimension in space experimentation
[NASA-NF-140] N84-17210
Considerations on the external combustion system of the Stirling hot gas engine
[NASA-TM-77026] N84-17302
Current trends and research challenges in land remote sensing N84-17651
The effect of various carbon sources on the growth of single-celled cyanophyta
[NASA-TM-77090] N84-17804
Introduction to acoustic emission
[NASA-TM-77088] N84-18016
Rotary wing aircraft and technical publications of NASA, 1970 - 1982
[NASA-TM-85521] N84-18102
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Bifurcation analysis of aircraft pitching motions near the stability boundary
[NASA-TM-85881] N84-17137
Mathematical modeling of the aerodynamic characteristics in flight dynamics
[NASA-TM-85880] N84-17141
A recontoured, upper surface designed to increase the maximum lift coefficient of a modified NACA 65 (0.82) (9.9) airfoil section
[NASA-TM-85855] N84-17144
In-flight load testing of advanced shuttle thermal protection systems
[NASA-TM-86024] N84-17250
Research and technology report, 1983
[NASA-TM-85865] N84-18152
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. HUGH L. DRYDEN FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
In-flight load testing of advanced shuttle thermal protection systems
[NASA-TM-86024] N84-17250
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Thermal energy management process experiment N84-17222
Probe measurement of DC electric fields N84-17255
Interaction of the space shuttle orbiter with the ionospheric plasma N84-17265
Impact ionization effects on Pioneer Venus Orbiter N84-17270
Models of the hard X-ray spectrum of AM Herculis and implications for the accretion rate
[NASA-TM-86045] N84-18123
Power spectral signatures of interplanetary corotating and transient flows
[NASA-TM-86051] N84-18131
Milgrom's revision of cosmic dynamics: Amending Newton's laws or Keplers?
[NASA-TM-86049] N84-18132
Interplanetary flow systems associated with cosmic ray modulation in 1977 - 1980
[NASA-TM-85120] N84-18149
Rapporteur paper for sessions MG1, MG3 and MG4: Modulation theory, interplanetary propagation and interplanetary acceleration
[NASA-TM-86047] N84-18150
A study of the diffuse galactic gamma radiation
[NASA-TM-86055] N84-18151
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Spectral methods for the Euler equations: Chebyshev methods and shock-fitting
[NASA-CR-172295] N84-17118
Spectral methods for the Euler equations: Fourier methods and shock-capturing
[NASA-CR-172294] N84-17119
Wave drag as the objective function in transonic fighter wing optimization
[NASA-TP-2265] N84-17127
Theoretical and experimental engine-inlet flow fields for fighter forebodies
[NASA-TP-2270] N84-17132
Aerodynamic characteristics of a Sparrow 3 missile model in the flow field of a generalized parent body at Mach 2.86
[NASA-TM-85713] N84-17134
Loads and aeroelasticity division research and technology accomplishments for FY 1983 and plans for FY 1984
[NASA-TM-85740] N84-17135
A comparison of two position estimate algorithms that use ILS localizer and DME information. Simulation and flight test results
[NASA-TP-2281] N84-17165
Friction and wear behavior of aluminum and composite airplane skins
[NASA-TP-2262] N84-17175
Wind-tunnel free-flight investigation of a model of a forward-swept-wing fighter configuration
[NASA-TP-2230] N84-17184
An on-line equivalent system identification scheme for adaptive control
[NASA-TM-85737] N84-17185
IMAGES: A digital computer program for interactive modal analysis and gain estimation for eigensystem synthesis
[NASA-TM-85690] N84-17186
STEP Experiment Requirements
[NASA-CP-2294] N84-17211
Space Technology Experiments Platform (STEP) overview N84-17212
STEP mechanical systems N84-17213
STEP electronic system design N84-17214
STEP experiment integration N84-17215
Deployable beam flight experiment (MAST) N84-17218
Erectable beam experiment N84-17219
Vibration isolation technology experiment N84-17228
Integrated Power/Attitude Control System (IPACS) technology experiment N84-17229
Large deployable antenna flight experiment for the Space Technology Experiments Platform (STEP) N84-17232
Large inflated-antenna system N84-17234
Adaptive microwave reflector N84-17235
Microwave reflector characterization using simple instruments in EVA N84-17236
Correlations of supersonic boundary-layer transition on cones including effects of large axial variations in wind-tunnel noise
[NASA-TP-2229] N84-17534
A nonintrusive nuclear monitor for measuring liquid contents in sealed vessels
[NASA-TM-85754] N84-17560
Threshold kinetics of a solar-simulator-pumped iodine laser
[NASA-TP-2241] N84-17575
A finite difference scheme for the equilibrium equations of elastic bodies
[NASA-CR-172293] N84-17621
Flight measurement and analysis of AAFE RADSCAT wind speed signature of the ocean
[NASA-TM-85646] N84-17784
Modelling algorithm execution time on processor arrays
[NASA-CR-172289] N84-17899
PASCAL/48 reference manual
[NASA-TM-85752] N84-17900
Spline-based estimation techniques for parameters in elliptic distributed systems
[NASA-TM-85439] N84-17947
Experimental blade vortex interaction noise characteristics of a utility helicopter at 1/4 scale
[NASA-TM-84653] N84-18018
Neon transport in selected organic composites
[NASA-TM-85693] N84-18044
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Programs for calculating quasi-three-dimensional flow in a turbomachine blade row
[NASA-TM-83588] N84-17138
Comparison of secondary flows predicted by a viscous code and an inviscid code with experimental data for a turning duct
[NASA-TM-83575] N84-17142
Investigation of flow phenomena in a transonic fan rotor using laser anemometry
[NASA-TM-83555] N84-17143
NASCAP simulations of spacecraft charging of the SCATHA satellite N84-17268
The role of potential barrier formation in spacecraft charging N84-17269
Preliminary study of thermomechanical fatigue of polycrystalline MAR-M 200
[NASA-TP-2280] N84-17350
Metallic glass as a temperature sensor during ion plating
[NASA-TM-83566] N84-17351
Tribological characteristics of gold films deposited on metals by ion plating and vapor deposition
[NASA-TM-83572] N84-17352
Factors which influence directional coarsening of Gamma prime during creep in nickel-base superalloy single crystals
[NASA-TM-83595] N84-17353
Influence of composition on the microstructure and mechanical properties of a nickel-base superalloy single crystal
[NASA-TM-83563] N84-17354
Influence of cobalt, tantaum and tungsten on the high temperature mechanical properties of single crystal nickel-base superalloys
[NASA-TM-83479] N84-17355
A mathematical model for the doubly-fed wound rotor generator, part 2
[NASA-TM-83581] N84-17479
Hot-flow tests of a series of 10-percent-scale turbofan forced mixing nozzles
[NASA-TP-2268] N84-17525
Experimental study of bubble cavities attached to a rotating shaft in a reservoir
[NASA-TM-83586] N84-17533
Effects of different rub models on simulated rotor dynamics
[NASA-TP-2220] N84-17590
The ball bearing as a rheological test device
[NASA-TM-83570] N84-17591
Hydrodynamic lubrication of rigid nonconformal contacts in combined rolling and normal motion
[NASA-TM-83578] N84-17592
A study of nucleation and growth of thin films by means of computer simulation: General features
[NASA-TM-83559] N84-17982
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Space Processing Applications Rocket (SPAR) project, SPAR 9
[NASA-TM-82549] N84-17239
Interaction of the space shuttle orbiter with the ionospheric plasma N84-17265
A potential control method for thermal plasma measurements on the DE-1 spacecraft N84-17276
Methods for keeping a conductive spacecraft near the plasma potential N84-17277
Wind speed and direction shears with associated vertical motion during strong surface winds
[NASA-TM-82566] N84-17756
Evidence linking coronal mass ejections with interplanetary magnetic clouds
[NASA-TM-82564] N84-18141
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Apparatus and method for destructive removal of particles contained in flowing fluid
[NASA-CASE-NPO-15426-1] N84-17555

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.
Hydrogen sulfide provisional thermophysical properties from 188 to 700 K at pressures to 75 MPa
[PB84-122704] N84-17329
Handbook for broadband isotropic antenna system. Volume 1: Operation manual
[PB84-101948] N84-17510
NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Look at techniques for the dimensional calibration of standard microscopic particles
[PB84-112648] N84-17324
Ozone reactions in aqueous solutions: A bibliography
[PB84-109883] N84-17325
Journal of Research of the National Bureau of Standards. Volume 88, Number 3, May-June 1983
[PB84-115799] N84-17328
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A135549] N84-17363
NBS (National Bureau of Standards): Materials measurements
[NASA-CR-173162] N84-17384
Journal of Research of the National Bureau of Standards. Volume 88, Number 5, September-October 1983
[PB84-125293] N84-17406
Report of the 68th National Conference on Weights and Measures 1983
[PB84-110998] N84-17425
Civilian residential fire fatality rates: Six high-rate states versus six low-rate states
[PB84-102615] N84-17427
Development of power system measurements
[PB84-109891] N84-17509
AC voltage calibrations for the 0.1 Hz to 10 Hz frequency range
[PB84-109867] N84-17570
National Bureau of Standards Journal of Research, volume 88, no. 4, July - August 1983
[PB84-115849] N84-17571
Specifications, tolerances, and other technical requirements for weighing and measuring devices
[PB84-125764] N84-17572
Determination of the viscoelastic shear modulus using forced torsional vibrations
[PB84-119700] N84-17638
Computer Science and Technology: Proceedings of the 19th Meeting of the Computer Performance Evaluation Users Group (CPEUG)
[PB84-114529] N84-17892
Initial graphics exchange specification test library, version 1.3
[PB84-102144] N84-17922
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
Effect of diabatic and frictional processes on frontal circulations
[PB84-104074] N84-17778
Frontogenesis in a moist atmosphere
[PB84-104066] N84-17779
NATIONAL DEFENSE UNIV., WASHINGTON, D. C.
The national space program from the fifties into the eighties
[AD-A134799] N84-17197
NATIONAL ELECTRICAL ENGINEERING RESEARCH INST., PRETORIA (SOUTH AFRICA).
Environmental factors as a source of failure in integrated circuits N84-17604
NATIONAL ENVIRONMENTAL SATELLITE SERVICE, WASHINGTON, D. C.
Determination of the planetary radiation budget from TIROS-N satellites
[PB84-100916] N84-17748
A statistical technique for forecasting severe weather from vertical soundings by satellite and radiosonde
[PB84-114099] N84-17772
NOAA (National Oceanic and Atmospheric Administration) satellite programs briefing
[PB84-108349] N84-17781
NATIONAL GEODETIC SURVEY, ROCKVILLE, MD.
Subsidence monitoring for state of Arizona
[PB84-126960] N84-17750
NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.
Solar-geophysical data center number 467, July 1983, part 1 (prompt reports). Data for June 1983, May 1983 and late data
[PB84-100486] N84-18144
Solar-geophysical data number 467, July 1983, part 2 (comprehensive reports). Data for January 1983, November 1980 and miscellanea
[PB84-100494] N84-18145
NATIONAL INST. VOOR KERNFYSICA EN HOGE ENERGIEYSICA, AMSTERDAM (NETHERLANDS).
Activities in nuclear and high energy physics N84-18043
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Light scattering condensation nuclei, and air mass trajectories at Whiteface Mountain: Summer 1982
[PB84-104363] N84-17742
NIMBUS-7 SBUV (Solar Backscatter Ultraviolet) observations of solar UV spectal irradiance variations caused by solar rotation and active-region evolution for the period November 7, 1978 - October 26, 1979
[PB84-108166] N84-17743
Homogeneous magnitude system of the Eurasian continent: S and L waves
[PB84-101161] N84-17744
Summary of earthquake intensity file: A computerized file of the effects of earthquakes in the United States
[PB84-101443] N84-17745
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, PRINCETON, N.J.
FGGE level 3-B daily global analyses. Part 2: (Mar. 1979 - May 1979)
[PB84-100270] N84-17780
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.
Preparing meteorological data for use in routine dispersion calculations: Workgroup summary
[PB84-119890] N84-17774
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
Mariners weather log, volume 27, number 3, summer 1983
[PB84-108356] N84-17771
NATIONAL OCEANOGRAPHIC DATA CENTER, WASHINGTON, D. C.
NODC (National Oceanographic Data Center) inventory of XBT data along transects in U.S. Atlantic and Gulf coastal waters from NMFS/MARD ship of opportunity program for 1981
[PB84-122662] N84-17802
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, ANNAPOLIS, MD.
FM spectral modeling and FDM/FM simulation programs
[PB84-116934] N84-17469
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
Attenuation of millimeter waves on Earth-space paths by rain clouds
[PB84-115120] N84-17471
A diagnostic probe to investigate propagation at millimeter wavelengths
[PB84-104223] N84-17473
NATIONAL WEATHER SERVICE, GARDEN CITY, N.Y.
TERR, PERR, and GIGC: Three programs to compute verification statistics
[PB84-127521] N84-17775
NATIONAL WEATHER SERVICE, KANSAS CITY, MO.
Meteorological applications library (CRH.LB)
[PB84-122639] N84-17776
Thermodynamics library for AFOS (Automation of Field Operations and Services) programmers (THERMO LB)
[PB84-122621] N84-17925
NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
Pertinent meteorological data for hurricane Allen of 1980
[PB84-104322] N84-17766
Probable maximum precipitation and snowmelt criteria for southeast Alaska
[PB84-104371] N84-17777
NAVAL ACADEMY, ANNAPOLIS, MD.
Determination of individual temperatures and luminosities in eclipsing binary star systems
[AD-A134182] N84-18133
NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
The 2-dimensional inextensible lifting membrane airfoil, theory and experiment
[AD-A135251] N84-17147
Aluminum-manganese plating from a molten salt bath
[AD-A135240] N84-17356
Blood flow measurements under high-G conditions: Early prediction of Gz tolerance
[AD-A134653] N84-17823
TIGS (table plot interactive graphics system)--an interactive graphical system for the creation and correction of tabular data sets
[AD-A135522] N84-17906
NAVAL BIODYNAMICS LAB., NEW ORLEANS, LA.
A detailed evaluation of the Endevco model 7302 (trade name) angular accelerometer
[AD-A134882] N84-17562
NAVAL HEALTH RESEARCH CENTER, SAN DIEGO, CALIF.
Extending human effectiveness during sustained operations through sleep management
[AD-A134782] N84-17825
NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Microfiche Image Transmission System (MITS) demonstration field evaluation of microfacsimile
[AD-A134716] N84-17450
Asymptotic properties of extended Yule-Walker estimates of the AR parameters of an ARMA (autoregressive moving-average)
[AD-A134981] N84-17970
NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Variable area ejector-diffuser model tests
[AD-A134843] N84-17182
Characteristics of a four nozzle, slotted mixing stack with slanted shroud, gas eductor system
[AD-A134794] N84-17547
A determination of the constants for a second-order closure turbulence model from geophysical data
[AD-A134826] N84-17795
A computer program for solving the parabolic equation using an implicit finite-difference solution method and incorporating exact interface conditions
[AD-A135325] N84-17903
A multiple leg TMA (Target Motion Analysis) procedure with programs for the Hewlett-Packard HP-41CV, the Hewlett-Packard HP-75C, the sharp pC-1500 (TRS-80 pC and the Radio Shack TRS-80 model 100 portable computers
[AD-A134870] N84-17912
Linear time-variant space-variant filters and the WKB approximation
[AD-A134886] N84-18021
NAVAL RESEARCH LAB., WASHINGTON, D. C.
Dependence of thermoluminescence output on temperature during irradiation for several thermoluminescence phosphors
[AD-A134940] N84-17313
A new derivation for the rough surface reflection coefficient and for the distribution of sea wave elevations
[AD-A134774] N84-17453
Adaptive feedforward linear wideband HF power bank
[AD-A134744] N84-17493
Automated acceptance test procedures for wideband microwave synthesized signal generator testing
[AD-A134923] N84-17563
The evolution of spontaneous and coherent radiation in the free electron laser oscillator
[AD-A134458] N84-17583
Nonlinear mode coupling theory of the lower-hybrid-drift instability
[AD-A135538] N84-17734
Sea salt aerosol, atmospheric radon and meteorological observations in the western South Atlantic Ocean (February 1981)
[AD-A134792] N84-17794
BERTHA: A versatile transmission line and circuit code
[AD-A135024] N84-17886
Solitary waves in water colliding head-on
[AD-A135537] N84-17964
A comparison of explicit time integration techniques for the finite element shock wave equations
[AD-A134757] N84-17968
External injection into a high current modified betatron accelerator
[AD-A134694] N84-18030
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.
Design, construction and test of a 0.61-meter-diameter, epoxy impregnated superconductive magnet
[AD-A135339] N84-18009
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
Numerical computation of steady state scattered sound external to submerged infinite cylinders by combining finite element and integral equation methods
[AD-A134773] N84-18020
NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
An active filter primer
[AD-A134838] N84-17498
NAVAL UNDERWATER SYSTEMS CENTER, NEWPORT, R.I.
Numerical methods for singular perturbation problems
[AD-A134696] N84-17966
NAVAL WEAPONS ENGINEERING SUPPORT ACTIVITY, WASHINGTON, D. C.
Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 1
[AD-A134833] N84-17154

Aircrew Automated Escape Systems (AAES) In-service Usage Data Analyses, volume 2
[AD-A134834] N84-17155

NEBRASKA UNIV., LINCOLN.
Entropy production during fatigue as a criterion for failure. The critical entropy threshold: A mathematical model for fatigue
[AD-A134767] N84-17628

NEW MEXICO STATE UNIV., LAS CRUCES.
Multifrequency synthetic aperture radar antenna comparison study
[NASA-CR-171736] N84-17434
Cylindrical microstrip array: C-band beacon antenna array with 48 rectangular radiating elements fed in-phase
[AD-A135144] N84-17442

NEW MEXICO UNIV., ALBUQUERQUE.
Virtual cathode oscillations
[AD-A135120] N84-18027

NEW YORK UNIV., NEW YORK.
Accuracy of stable schemes for 2D scalar conservation laws
[DE84-004989] N84-17976
Automatic adaptive grid refinement for the Euler equations
[NASA-CR-173161] N84-17977

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.
Prediction of vortex shedding from circular and noncircular bodies in supersonic flow
[NASA-CR-3754] N84-17129
A study of prediction methods for the high angle-of-attack aerodynamics of straight wings and fighter aircraft
[NASA-CR-3764] N84-17131
Studies and vorticity effects by the Euler equations with emphasis on supersonic flow fields
[AD-A135118] N84-17535

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIV., GREENSBORO.
Thermal conductivity of ternary and quaternary III-V compounds
[AD-A135336] N84-18070

NORTH CAROLINA STATE UNIV., RALEIGH.
Effects of high energy radiation on the mechanical properties of epoxy graphite fiber reinforced composites
[NASA-CR-173293] N84-17292
An analytical study of cylindrical- and spherical-rectangular microstrip antennas N84-17428
A stochastic network formulation for performance assessment and life-cycle modeling in complex system design
[AD-A135337] N84-17960

NORTH CAROLINA UNIV., CHAPEL HILL.
Capacity of mismatched Gaussian channels
[AD-A134982] N84-17455
Convergence of quadratic forms in p-stable random variables and theta sub p-radonifying operators
[AD-A135314] N84-17959
Identification of a class of filtered Poisson processes
[AD-A134970] N84-17969

NORTH CAROLINA UNIV., RALEIGH.
Heterojunction solid-state devices for millimeter-wave sources
[AD-A135389] N84-17490

NORTH DAKOTA GEOLOGICAL SURVEY, GRAND FORKS.
Geological and geochemical controls on the chemical evolution of subsurface water in undisturbed and surface-mined landscapes in western North Dakota
[PB84-126952] N84-17685

NORTHEASTERN UNIV., BOSTON, MASS.
Asynchronous discrete control of continuous processes
[AD-A135257] N84-17930

NORTHWESTERN UNIV., EVANSTON, ILL.
Chloride ion conductivity in a plasticized quaternary ammonium polymer
[AD-A135373] N84-17305
Bifurcation and stability theory with application to problems of combustion and flame propagation
[AD-A135383] N84-17306
Thermocapillary flows and their stability: Effects of surface layers and combination
[NASA-CR-170962] N84-17522
Plane stress crack-line fields for crack growth in an elastic perfectly-plastic material
[AD-A134868] N84-17630

NOTRE DAME UNIV., IND.
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 1
[AD-A135232] N84-17485
Real-time implementation of a speech digitization algorithm combining time-domain harmonic scaling and adaptive residual coding, volume 2
[AD-A135233] N84-17486

O

OAK RIDGE NATIONAL LAB., TENN.
Comparison of the characteristics of graphites irradiated at 600 and 9000 deg C
[DE83-015695] N84-17297
Improved swelling resistance for PCA austenitic stainless steel under HFIR irradiation through microstructural control
[DE84-003203] N84-17370
Development of modified 9 Cr-1 Mo steel for elevated-temperature service
[DE84-003161] N84-17372
Temperature aspects of pulsed ion bombardment in an austenitic alloy
[DE84-003382] N84-17376
Effect of specimen size and nickel content on the impact properties of 12 Cr-1 MoVW ferritic steel
[DE84-003270] N84-17377
Ion beam modification of ceramics
[DE84-003302] N84-17403
Diesel fuel extenders and substitutes
[DE84-003402] N84-17597
Conductivity mapping of underground flow channels and moisture anomalies in carbonate terrain using electromagnetic methods
[DE84-004098] N84-17677
Estimation of small area populatons using remote sensing and other approaches
[DE84-003404] N84-17678
Atmospheric deposition to forests
[DE84-003384] N84-17700
Chemical and biological processes in CO/sub 2-ocean models
[DE84-003304] N84-17702
Can we delay a greenhouse warming
[DE84-003390] N84-17703
Torsional ultrasonic technique for reactor vessel liquid level measurement
[DE84-003357] N84-18024
Two-level compromise designs for estimating main effects and detecting interactions
[DE84-002997] N84-18094

OBSERVATOIRE DE MEUDON (FRANCE).
Anomalous behavior of ISEE-1 detected by the electron density experiment N84-17259

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).
La Recherche Aerospatiale, bimonthly bulletin number 1983-2, 213/March-April
[ESA-TT-817] N84-18013
La Recherche Aerospatiale bimonthly bulletin, number 1983-3, 214/May-June
[ESA-TT-822] N84-18014

OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, D. C.
Meeting the automatic data processing and telecommunications needs of the federal government: A five-year plan
[PB83-195255] N84-18111

OFFICE OF NAVAL RESEARCH LIASON OFFICE, FAR EAST, APO, SAN FRANCISCO, CALIF.
ONR Far East Scientific Bulletin. Volume 8, no. 3, July - September 1983
[AD-A134272] N84-18109

OFFICE OF RADIATION PROGRAMS, WASHINGTON, D. C.
Environmental Radiation Data Report 33, January - March 1983
[PB84-104785] N84-17708
Environmental Radiation Data Report 31, July - September 1982
[PB84-104801] N84-17709
Environmental Radiation Data Report 32, October December 1982
[PB84-104793] N84-17710

OFFICE OF SOFTWARE DEVELOPMENT, FALLS CHURCH, VA.
Sperry Univac, Univac 1100/80, UBASIC/BBASIC level 9R1
[PB84-113901] N84-17919
Sperry Univac, Univac 1100/80, ASCII FORTRAN level 10R1A
[PB84-113893] N84-17920

OHIO STATE UNIV., COLUMBUS.
Documentation of ice shapes on the main rotor of a UH-1H helicopter in hover
[NASA-CR-168332] N84-17139
The retrieval of atmospheric constituent mixing-ratio profiles from solar absorption spectra
[NASA-CR-173303] N84-17730
A test strategy for high resolution image scanners
[AD-A134998] N84-18048

OHIO UNIV., ATHENS.
Path discrepancies between great circle and rhumb line
[NASA-TM-85522] N84-17168

OLD DOMINION UNIV., NORFOLK, VA.
Investigation of design considerations for a complex demodulation filter
[NASA-CR-173295] N84-17195
Airborne antenna pattern calculations
[NASA-CR-173284] N84-17436
Analysis of longwave radiation for the Earth-atmosphere system
[NASA-CR-173155] N84-17437
Stability of the laminar boundary layer in a streamwise corner
[NASA-CR-173282] N84-17532
Theoretical studies of solar-pumped lasers
[NASA-CR-173283] N84-17576

ORANGE FREE STATE UNIV., BLOEMFONTEIN (SOUTH AFRICA).
A stopping rule for a multi-person cooperative game
[TR-87] N84-17981

OREGON GRADUATE CENTER FOR STUDY AND RESEARCH, BEAVERTON.
Evaluation of turbulence induced noise in coherent anti-Stokes Raman scattering
[NASA-CR-166544] N84-18015

OVERSEAS RELATIONS BRANCH TRANSLATION SERVICE, LONDON (ENGLAND).
Vacuum ionic carburisation
[BLL-OA-TRANS-3149-(6196.3)] N84-17291
Applications of solvent extraction in hydrometallurgy
[BLL-OA-TRANS-3162-(6196.3)] N84-17334
Nitriding with a pulsed glow discharge
[BLL-OA-TRANS-3168-(6169.3)] N84-17335
The electrochemical behaviour of titanium platinum alloys in anodic oxidation processes. 1: Kinetics and selectivity of the process of the combined formation of O2, H2S2O8 and O3 on the titanium-platinum alloy
[BLL-OA-TRANS-3093-(6196.3)] N84-17336
Electrodeposition method
[BLL-OA-TRANS-3134-(6196.3)] N84-17337
Production of titanium powders by the electrolysis of chloride-fluoride melts with a soluble anode
[BLL-OA-TRANS-3136-(6196.3)] N84-17338
Process and cell arrangement for producing difficult to reduce elements by fused salt electrolysis
[BLL-OA-TRANS-3137-(6196.3)] N84-17339
Method and apparatus for the rapid determination of gases, oxygen in particular, and of the combined forms in which they are present in metals
[BLL-OA-TRANS-3127-(6196.3)] N84-17340
Optimization of the parameters of the arc suppressing system of high-voltage apparatuses with a thyristor attachment
[BLL-OA-TRANS-3139-(6196.3)] N84-17476
Infrared heating
[BLL-OA-TRANS-3121-(6196.3)] N84-17512
Heat pump units with electrically driven compressors for water heating
[BLL-OA-TRANS-3181-(6196.3)] N84-17514
The cathode material for a plasma-arc heater
[BLL-OA-TRANS-3126-(6196.3)] N84-18053

P

PAPIERMOLEN 4, LEIDEN (NETHERLANDS).
Multi-dimensional continued fraction algorithms N84-18003

PARIS UNIV. (FRANCE).
Ten years of Hoare's logic, a survey. Part 2: Nondeterminism N84-17882

PARKER (LEE W.), INC., CONCORD, MASS.
Contributions to satellite sheath and wake modeling N84-17266
A model of electrostatic charging and sheath structure of GIOTTO near Halley's comet N84-17274

PEDA CORP., PALO ALTO, CALIF.
Universal single level implicit algorithm for gasdynamics
[NASA-CR-166531] N84-17936

PENNSYLVANIA COLL. OF OPTOMETRY, PHILADELPHIA.
ERG (Electroretinogram) implicit time: An exploration of high frequency wavelets recorded in the human visual system
[AD-A134575] N84-17832

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
The effect of gas bubbles and cavity dimensions on the local electrode potential within pits, crevices and cracks
[AD-A134729] N84-17364
Electrical-shock prevention. Volume 1: Protection of maintenance personnel
[PB84-102946] N84-17865

Electrical-shock prevention. Volume 2: Ground-fault interrupting devices
[PB84-102953] N84-17866

Electrical-shock prevention. Volume 3: Fault protection for motion-drive equipment
[PB84-102961] N84-17867

Electrical-shock prevention. Volume 4: Overhead-line contact fatalities
[PB84-102979] N84-17868

PENNSYLVANIA UNIV., PHILADELPHIA.

Photoemission spectroscopy and the optical properties of surface
[PB84-100445] N84-17331

Structural and electrochemical properties of platinum-titanium laser surface alloys N84-17348

A new approach to polymer chemistry: Organometallic and bioactive phosphazenes
[AD-A135429] N84-17396

A method of measurement of behavioral factors affecting information systems design and use: An application of multidimensional scaling in uncovering individual psychological structure N84-18099

PHILIPS DATA SYSTEMS B. V., APELDOORN (NETHERLANDS).

Factorization algorithms of exponential order N84-17994

PHILIPS TELECOMMUNICATION INDUSTRIES, HILVERSUM (NETHERLANDS).

Correlative phase modulation for fixed satellite services, volume 1 (phase 1)
[PTI-SB-2363-21-3505-VOL-1] N84-17465

Correlative phase modulation for fixed satellite service-s. Volume 2: Supplementary report
[PTI-SB-2363-21-3794-VOL-2] N84-17466

PHRASOR SCIENTIFIC, INC., DUARTE, CALIF.

Ion source for a rocket payload
[AD-A135051] N84-17289

PITTSBURGH UNIV., PA.

Lithological characterization of crystalline basement rock provinces of the interior of the United States
[NASA-CR-175180] N84-17727

Problem solving abilities
[AD-A134717] N84-17840

POLYTECHNIC INST. OF NEW YORK, BROOKLYN.

Interaction of electromagnetic fields with plasma
[AD-A135173] N84-18054

PRINCETON UNIV., N. J.

Aeroelastic analysis using nonlinear aerodynamic methods
[AD-A135133] N84-17146

A photoacoustic study of chemically active systems
[AD-A134863] N84-17311

VLSI, algorithms and graphics N84-17878

PURDUE UNIV., LAFAYETTE, IND.

Dynamics and control of forward swept wing aircraft
[NASA-CR-175369] N84-17172

Precipitation mechanisms in aluminum-lithium alloys
[AD-A134836] N84-17367

Three-dimensional measurements of fatigue crack closure
[NASA-CR-175366] N84-17616

In vitro chlorophyll photosynthetic reaction
[PB84-104892] N84-17810

Objective measure of pilot workload
[NASA-CR-173296] N84-17858

On using selection procedures with binomial models
[AD-A135275] N84-17957

Nonparametric selection procedures for a two-way layout problem
[AD-A135385] N84-17962

Isotonic procedures for selecting populations better than a standard: Two-parameter exponential distributions
[AD-A135445] N84-17985

R

RENSSELAER POLYTECHNIC INST., TROY, N. Y.

Composite structural materials
[NASA-CR-173259] N84-17293

Tempering kinetics of alloy steels as a function of quench rate and M sub s temperature
[AD-A134806] N84-17365

On the effect of fine grain size on the M sub s temperature in Fe-27Ni-0.025C alloys
[AD-A134807] N84-17366

Emission FTIR analyses of thin microscopic patches of jet fuel residue deposited on heated metal surface
[NASA-CR-168331] N84-17410

Simply instrumentable and optimal digitization of analog information sources
[AD-A135124] N84-17484

RESEARCH INST. OF NATIONAL DEFENCE, LINKOEPING (SWEDEN).

SAPIENS MEMO 5: The mechanical design of the EMP-simulator SAPIENS
[FOA-C-30320-A3] N84-17192

Investigation of encryptation for satellite communications
[FOA-C-30300-E1] N84-17457

Nuclear explosion effects on telecommunication, etc. (effect of EMP and of ionizing radiation on electronics and optical electronics
[FOA-C-30302-A3] N84-17458

Comparative antenna measurements in real environment: Steerable null antenna at 30 - 76 MHz
[FOA-C-30303-E2] N84-17459

A program for computer-controlled impedance measurement within the microwave range
[FOA-C-30330-E3] N84-17460

Silent radar: A study of the performances of a navigational radar with limited range
[FOA-C-30334-E1] N84-17461

Transmission line transformers; theory and design data
[FOA-C-30327-E] N84-17503

Distance measurement to line of sight obstacles close to roads, a commission from Statens Vaeg och Trafikinstitute (VTI)
[FOA-C-30333-E1] N84-17586

Report from the URSI Commission F Symposium on Wave Propagation and Remote Sensing
[FOA-C-30340-E2] N84-17682

Development of a computer program for road detection in satellite images
[FOA-C-30316-E1] N84-17917

Desk-top computer controlled instrument lathe for machining with high form accuracy
[FOA-C-30339-E1,E3] N84-17918

Image analysis with use of range information
[FOA-C-30335-E1] N84-17979

RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).

Explosion and fire hazards in an oil-oxygen system
[FOA-C-20507-D1] N84-17159

Terminal work in the process industry: Experience in a time perspective. Part 2: A few years after the installation
[FOA-C-56039-H2-PT-2] N84-17422

Technical theory of pneumatic beams
[FOA-C-20504-E4] N84-17634

Preliminary field tests for detecting flying targets in front of a land background
[FOA-C-56033-H2] N84-17847

Detection of flying targets in front of a land background: Laboratory tests
[FOA-C-56034-H2] N84-17848

Detection of flying targets in front of a land background: Field tests
[FOA-C-56035-H2] N84-17849

Man and machine. The role of human factors in system development
[FOA-A-56005-H2] N84-17863

Protection against heat radiation in the steel industry
[FOA-C-20500-E4] N84-17864

Improvement of the memory allocation algorithm for evaluating query language expressions in the relational database handler CANTOR
[FOA-C-20508-D8] N84-17916

Reduction of propeller noise by a reflecting rubber layer
[FOA-C-20506-E4] N84-18025

RESEARCH INST. OF NATIONAL DEFENCE, UMEA (SWEDEN).

Airborne fallout monitoring
[FOA-A-40045-A3] N84-17705

Risk models for risk distance prediction during release of toxic industrial chemicals caused by acts of war
[FOA-C-40185-C2(H2)] N84-17707

A model for simulation of a fluctuating plume
[FOA-C-40165-A1(C1)] N84-17741

RESEARCH TRIANGLE INST., RESEARCH TRIANGLE PARK, N.C.

CDTI target selection criteria
[NASA-CR-3776] N84-17178

RHODE ISLAND UNIV., KINGSTON.

Design and prototype implementation of SCAN: A programming language for scene analysis N84-17893

RICE UNIV., HOUSTON, TEX.

Conformal solution methods based on the hard convex body expansion theory, section 1
[PB84-100940] N84-17332

Review of radio-frequency, nonlinear effects on the ionosphere
[DE84-003832] N84-17739

ROCHESTER UNIV., N. Y.

Synthesis and characterization of binuclear Schiff base complexes of nickel, copper, and manganese
[AD-A135493] N84-17360

Theoretical aspects of laser-induced periodic surface structure formation
[AD-A134875] N84-17581

Hierarchical cache accumulators for sequential mode estimation
[AD-A134696] N84-17908

Time-varying speckle phenomena in astronomical imaging and in laser scattering N84-18118

ROCKWELL INTERNATIONAL CORP., CANOGA PARK, CALIF.

SP-100 program: Space reactor system and subsystem investigations
[DE84-003217] N84-18045

ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF.

Development of Test Article Building Block (TABB) for deployable platform systems N84-17226

A deployable structure and solar array controls experiment for STEP N84-17227

ROCKWELL INTERNATIONAL CORP., LOS ANGELES, CALIF.

Airloads research study. Volume 1: Flight test loads acquisition
[NASA-CR-170409] N84-17173

Airloads research study. Volume 2: Airload coefficients derived from wind tunnel data
[NASA-CR-10410] N84-17174

ROCKWELL INTERNATIONAL CORP., SEAL BEACH, CALIF.

Low concentration ratio solar array structural configuration N84-17225

ROCKWELL INTERNATIONAL CORP., THOUSAND OAKS, CALIF.

Advanced on-board signal procesor GaAs memory
[AD-A135485] N84-17890

Advanced filter technology
[AD-A135446] N84-18050

InGaPAs by metalorganic chemical vapor deposition
[AD-A135281] N84-18069

ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.

S-band range tracker and Surveillance Lab interface
[AD-A134730] N84-17451

ROYAL GREENWICH OBSERVATORY, HERSTMONCEUX (ENGLAND).

First, second and third Herstmonceux catalogues of stars for 1950.0
[BULL-189] N84-18125

Narrow-band photometry of faint red stars, 2
[BULL-191] N84-18126

ROYAL INST. OF TECH., STOCKHOLM (SWEDEN).

The potential of ISEE in different plasma environments N84-17257

ROYAL NETHERLANDS METEOROLOGICAL INST., DE BILT.

Dispersion experiments with sulfur hexafluoride from the 213m high meteorological mast at Cabauw in the Netherlands N84-17706

RUTGERS - THE STATE UNIV., NEW BRUNSWICK, N. J.

Services for the analysis and evaluation of information
[PB84-104504] N84-18113

RUTGERS UNIV., NEW BRUNSWICK, N. J.

Ionic conductivity of Li7BiO6
[AD-A135386] N84-17307

S

SAINT LOUIS UNIV., MO.

Contributions to the theory of quantum 1/f noise N84-18082

SAN DIEGO STATE UNIV., CALIF.

Signal detection for same-shape families of non-homogeneous Poisson processes
[AD-A135032] N84-17942

SANDIA LABS., ALBUQUERQUE, N. MEX.

Development of the parachute recovery system for the LBRV-2 reentry vehicle
[DE84-003340] N84-17151

Friction and wear reduction of 440C stainless steel by ion implantation
[DE84-003255] N84-17371

Theory of dynamic ferroelectricity
[DE84-002609] N84-17500

Sensitivity and accuracy analysis of pulse diffusivity measurements on layered samples
[DE84-002104] N84-17584

Frequency and mode shape calculations for vertical axis wind turbines using reduction techniques and complex eigensolvers
[DE84-003316] N84-17633

Study of thermal fatigue of soldered photovoltaic cells by thermal resistance measurement
[DE84-003764] N84-17692
L2-projection for transferring data between finite element meshes
[DE84-000063] N84-17973
Light ion fusion
[DE84-003767] N84-18061
Metallic microwave conductivity in shock-loaded rutile
[DE84-002174] N84-18075

SANTA FE RESEARCH CORP., N. MEX.
Effects of diesel vehicles on visibility in California
[PB84-122167] N84-17714

SCIENCE APPLICATIONS, INC., PLEASANTON, CALIF.
Radially resolved simulation of a high-gain free electron laser amplifier
[DE84-003751] N84-17585

SCIENCE APPLICATIONS, INC., SAN DIEGO, CALIF.
Satellite measurements of atmospheric aerosols
[AD-A135241] N84-17757

SCIENCE APPLICATIONS, INC., WAYNE, PA.
Numerical simulation of flow over rough surfaces, including effects of shock waves
[AD-A134700] N84-17545

SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
Pattern recognition and image processing review N84-17697

SHELL EXPLORATION AND PRODUCTION LAB., RIJSWIJK (NETHERLANDS).
A multigrid method and a combined multigrid-conjugate gradient method for elliptic problems with strongly discontinuous coefficients in general domains
[PUBL-604-REV.] N84-17980

SHOCK AND VIBRATION INFORMATION CENTER (DEFENSE), WASHINGTON, D. C.
The Shock and Vibration Digest, volume 15, no. 9
[AD-A134750] N84-17609

SIEBELAIR CORP., LOS ANGELES, CALIF.
NSI-1 Squib adapter development and final test report for usage on space shuttle gas sampler valve/bottle assembly 3270
[NASA-CR-171735] N84-17556

SIMULA, INC., TEMPE, ARIZ.
Crashworthy cyclic control stick
[AD-A135150] N84-17176

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMDRIDGE, MASS.
Investigation of electrodynamic stabilization and control of long orbiting tethers
[NASA-CR-170972] N84-17251
A new model of the geomagnetic variation in the upper atmosphere
[AD-A135210] N84-17733
Combined ultraviolet studies of astronomical sources
[NASA-CR-175377] N84-18121

SOCIETE D'ETUDES ET DE SERVICES POUR SOUFFLERIES ET INSTALLATIONS AEROTHERMODYNAMIQUES, PARIS (FRANCE).
Investigation of free jets issued from small solid propellant rocket engines N84-17290

SOCIETE EUROPEENNE DE PROPULSION, VERNON (FRANCE).
GEOS 1 and 2 in flight evaluation of the reaction control system
[SEP-TS/S/194/JM/30301/81(1)] N84-17242

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, CANNES (FRANCE).
Model mission study for laser synchronization of clocks
[SNIAS-221-CA/LP] N84-17589

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, LES MUREAUX (FRANCE).
Orbital propulsion module system configuration study. Volume 1: Executive summary
[S/DT/YA-25-030-VOL-1] N84-17282
Orbital propulsion module system configuration study, volume 2
[S/DT/YA-25-030-VOL-2] N84-17283

SONICRAFT, INC., CHICAGO, ILL.
Advanced edit system
[AD-A134952] N84-17913

SOUTH AFRICAN BUREAU OF STANDARDS, PRETORIA.
Management input in quality N84-17602

SOUTHAMPTON UNIV. (ENGLAND).
Ion measurements on GEOS using a negatively biased sensor on a positively charged spacecraft N84-17263

SPACE SCIENCES, INC., MONROVIA, CALIF.
Mass spectrometric decomposition studies on several azido and nitrato polymers, thermal plasticizers and novel nitramines
[AD-A134636] N84-17398

SPERRY RAND RESEARCH CENTER, SUDBURY, MASS.
S-I-S mm-wave mixers and detectors
[AD-A134762] N84-18074

SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Knowledge representation and natural-language semantics
[AD-A135476] N84-17905

STANFORD UNIV., CALIF.
Technique for the rapid generation of OH radicals behind shock waves and its application to the study of combustion kinetics
[DE84-003183] N84-17317
Combustion gas spectroscopy using tunable lasers
[DE84-004976] N84-17320
Acoustic microscopy at cryogenic temperatures
[AD-A135089] N84-17421
Research in VLSI systems. Heuristic programming project and VLSI theory project. A fast turn around facility for very large scale integration (VLSI)
[AD-A134809] N84-17494
Photodiagnostics of turbulent flows using laser-induced fluorescence
[NASA-CR-166546] N84-17519
Improved turbulence models based on large eddy simulation of homogeneous, incompressible turbulent flows
[NASA-CR-166541] N84-17528
Verification of concurrent programs: A temporal proof system N84-17884
Experience with a regular expression compiler
[AD-A135202] N84-17888
Statistical data processing, system modeling and reliability
[AD-A135208] N84-17984
Growth and evaluation of AgGaS2 and AgGaSe2 for infrared nonlinear applications
[NASA-CR-175185] N84-18066
Film synthesis and new superconductors
[AD-A135102] N84-18068
The program complexity of searching a table
[AD-A135299] N84-18104
The interpretation of hard X-ray polarization measurements in solar flares
[NASA-CR-172790] N84-18142

STATE UNIV. OF NEW YORK, BUFFALO.
Experimental investigation of the turbulent axisymmetric jet N84-17518
Reasoning in multiple belief spaces N84-17894

STATE UNIV. OF NEW YORK, STONY BROOK.
Computer networks without a shared memory AFOSR-81-0197
[AD-A135074] N84-17927
Numerical solution of singular integral equations arising in mixed boundary value problems of elasticity
[AD-A134673] N84-17965

STEVENS INST. OF TECH., HOBOKEN, N. J.
A study of waves on a curved space-time N84-18083

SUSSEX UNIV., BRIGHTON (ENGLAND).
Squeeze-film damping of rotor-dynamic systems N84-17610

SVERDRUP TECHNOLOGY, INC., ARNOLD AIR FORCE STATION, TENN.
Inertial Upper Stage (IUS) Solid Rocket Motor (SRM) core flow sampling at high altitudes
[AD-A134997] N84-17288

SYRACUSE UNIV., N. Y.
The discrete convolution method for solving some large moment matrix equations
[AD-A135420] N84-18007

SYSTEMS APPLICATIONS, INC., SAN RAFAEL, CALIF.
Human exposure to atmospheric concentrations to selected chemicals, volume 1
[PB84-102540] N84-17835

T

TECHNION - ISRAEL INST. OF TECH., HAIFA.
On modifications of the Zakharov equation for surface gravity waves
[AD-A135050] N84-17943

TECHNISCHE HOCHSCHULE, AACHEN (WEST GERMANY).
The change of the mechanical properties of steel strip in processing lines
[BMFT-FB-T-83-178] N84-17383

TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).
Heron, volume 28, no. 1, 1983. Dynamic elasto-plastic model for reinforced concrete members
[PB84-109057] N84-17635

TECHNISCHE HOGESCHOOL, EINDHOVEN (NETHERLANDS).
Partially ordered computations with applications to VLSI design N84-17880

TECHNISCHE UNIV. MUNICH, GARCHING (WEST GERMANY).
Flow technical problems with transitions between partial and complete filling and with flow measurement in channel sections.
[TUM-SFB-81] N84-17552
Requirements for spaceborne remote sensing in geology N84-17657
Remote sensing for geology N84-17668

TEL-AVIV UNIV. (ISRAEL).
Mutual adaptiveness of man and machine in information acquisition tasks
[AD-A135449] N84-17932

TELESPAZIO, S.P.A., ROME (ITALY).
Traffic routing in a switched regenerative satellite. Volume 1, task 3: Traffic assignment
[ESA-CR(P)-1792-VOL-1] N84-17463
Traffic routing in a switched regenerative satellite. Volume 2, task 4: Review (executive summary)
[ESA-CR(P)-1792-VOL-2] N84-17464

TEXAS A&M UNIV., COLLEGE STATION.
Space Shuttle ice suppression system validation, volume 1
[NASA-CR-171740] N84-17244
Space Shuttle ice suppression system validation, volume 2
[NASA-CR-171741] N84-17245
Space Shuttle ice suppression system validation, volume 3
[NASA-CR-171742] N84-17246
Thermophysical properties of gaseous carbon dioxide/water mixtures
[PB84-125228] N84-17330
Fracture and contact problems for linearly viscoelastic material
[AD-A135111] N84-17624
Mechanical and transport properties of rocks at high temperatures and pressures. Task 3. Mechanical properties of rocks at high temperatures and pressures
[DE84-003438] N84-17740
Progress in numerical calculations of ion-atom collisions
[DE84-003405] N84-18033
Learning from numerical calculations of ion-atom collisions
[DE84-003265] N84-18035

TEXAS CHRISTIAN UNIV., FORT WORTH.
Synthesis of phosphorus-nitrogen polymers using Si-N-P reagents
[AD-A135224] N84-17392

TEXAS INSTRUMENTS, INC., DALLAS.
GaAs FET logic at low temperatures
[AD-A135007] N84-17483
Development of a solar energy system
[DE83-014236] N84-17690
Development of a solar energy system: Executive summary
[DE83-014392] N84-17693

TEXAS UNIV., ARLINGTON.
Finite element method for incompressible laminar boundary layer flows N84-17126

TEXAS UNIV., AUSTIN.
APQ-102 imaging radar digital image quality study
[NASA-CR-171738] N84-17435
A study of microwave and millimeter-wave quasi-optical planar mixers
[AD-A135252] N84-17443
Earth strain measurements with the transportable laser ranging system: Field techniques and planning
[NASA-CR-175150] N84-17725
Wave propagation study of the central Mediterranean Sea using ocean bottom seismometers
[AD-A135484] N84-17790
Mathematical simulation of the cardiopulmonary system
[AD-A135460] N84-17822
A distributed procedure to detect and/or deadlock
[AD-A135459] N84-17904
Preserving asymmetry by symmetric processes and distributed fair conflict resolution
[AD-A135458] N84-17986
Distributed algorithms for various problems
[AD-A135452] N84-18105

TEXAS UNIV., EL PASO.
Thermal and electric energy and desalination with a salt gradient solar pond
[DE84-900416] N84-17691

TEXAS UNIV., GALVESTON.
Formation and remodeling of the early wound matrix
[AD-A134576] N84-17833

THERMAL SCIENCES, INC., SUNNYVALE, CALIF.
Assessment of real gas effects on the prediction of the aerodynamics of high velocity Army shells
[AD-A134739] N84-17150

TRANSPORTATION SYSTEMS CENTER, CAMBRIDGE, MASS.
Synopsis and recommendations of the TSC Workshop on differential operation of NAVSTAR GPS, June 1983
[PB84-121599] N84-17170
Evaluation of visibility sensors at the Eglin Air Force Base climatic chamber
[AD-A135375] N84-17758
TRW ELECTRONIC SYSTEMS GROUP, REDONDO BEACH, CALIF.
S-band SBAW microwave source, phase 2
[NASA-CR-175153] N84-17432
The 20 GHz spacecraft FET solid state transmitter
[NASA-CR-168240] N84-17477
V-band integrated quadriphase modulator
[NASA-CR-175159] N84-17480

U

UNC NUCLEAR INDUSTRIES, INC., RICHLAND, WASH.
A new technique for measuring metal surface properties at the Rayleigh critical angle
[DE84-001770] N84-17632
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL (ENGLAND).
Effects of space radiation on advanced semiconductor devices. Part 1: A review of current theories and practice in cosmic ray simulation
[G-2532-VOL-1] N84-17505
Effects of space radiation on advanced semiconductor devices. Part 2: Cosmic ray simulation experiments for the study of single event upsets in CMOS technology
[G-2745-VOL-2] N84-17506
UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
Helicopter rotor wake geometry and its influence in forward flight. Volume 1: Generalized wake geometry and wake effect on rotor airloads and performance
[NASA-CR-3726] N84-17149
Mechanisms and reaction dynamics related to methane combustion
[PB84-100932] N84-17333
Aviation-fuel property effects on combustion
[NASA-CR-168334] N84-17407
Mass and momentum turbulent transport experiments with confined swirling coaxial jets
[NASA-CR-168252] N84-17530
Hot-wire measurements of velocity and temperature fluctuations in a heated turbulent boundary layer
[AD-A135212] N84-17538
UNIVERSITY COLL., LONDON (ENGLAND).
A study of satellite radar altimeter operation over ice-covered surfaces
[ESA-CR(P)-1810] N84-17683
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Strong motion effects due to seismic waves in dipping layers
[PB84-127919] N84-17747
Motivation and performance appraisal behavior
[AD-A134311] N84-17842
Automated synthesis of digital hardware modules: Simulation and verification of interconnections
[AD-A135298] N84-17889
UNIVERSITY OF SOUTHERN CALIFORNIA, MARINA DEL REY.
Inquiry semantics: A functional semantics of natural language grammar
[AD-A135153] N84-17929
UNIVERSITY OF SOUTHWESTERN LOUISIANA, LAFAYETTE.
Automatic synthesis of abstract data type implementations from abstract specifications
N84-17896
UTAH UNIV., SALT LAKE CITY.
Electrode noise in beta aluminas
[AD-A134837] N84-17497
Constraint driven synthesis of hardware design
N84-17870
International Conference on Stiff Computation
[AD-A135265] N84-17956
The cosmic ray energy spectrum from 2 x 10-17 to 10-e-19 EV N84-18146
UTRECHT STATE UNIV. (NETHERLANDS).
Distributed computing N84-17874
Systolic computation and VLSI N84-17877

V

VARTA BATTERIE A.G., KELKHEIM (WEST GERMANY).
Development of a modular battery
[BMFT-FB-W-83-021] N84-17504
VIRGINIA ASSOCIATED RESEARCH CENTER, NEWPORT NEWS.
TWINTN4: A program for transonic four-wall interference assessment in two-dimensional wind tunnels
[NASA-CR-3777] N84-17189
VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Muon spin rotation in solids
[NASA-CR-172789] N84-18067
VIRGINIA UNIV., CHARLOTTESVILLE.
New horizons in electromagnetic physics
[DE84-002600] N84-18039
VON KARMAN INST. FOR FLUID DYNAMICS, RHODE-SAINT-GENESE (BELGIUM).
Similar velocity profiles and integral quantities of a boundary layer on a rotating cylinder
[VKI-NT-148] N84-17553
VOUGHT CORP., DALLAS, TEX.
Development of a contact heat exchanger for a constructable radiator system
[NASA-CR-171730] N84-17523
High capacity heat pipe performance demonstration
[NASA-CR-171733] N84-17531

W

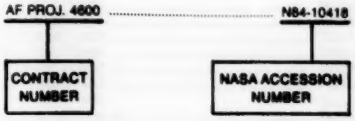
WARWICK UNIV. COVENTRY (ENGLAND).
The fairness problem and nondeterministic computing networks N84-17883
WASHINGTON UNIV., SEATTLE.
Nonlinear resonance
[AD-A135117] N84-17950
Scientific and technical information system for the Washington State Legislature
[PB84-100650] N84-18112
WASHINGTON UNIV., ST. LOUIS, MO.
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-175380] N84-17171
WEISSMAN (DAVID E.), NORTHPORT, N.Y.
A study of the dependence of radar backscatter cross section on wind speed and wave slope from the MARSEN experimental results (a contribution to studies of radar backscattering from the sea surface). Supplement to final report
[AD-A135041] N84-17441
WEST VIRGINIA UNIV., MORGANTOWN.
Switched-capacitor sampled-data networks with communication applications N84-17429
Analysis of electrical accident prevention countermeasures
[PB84-102987] N84-17869
WILLIAMS COLL., WILLIAMSTOWN, MASS.
Atomic hydrogen maser investigations of hydrogen atom interactions from 4 K to 12 K
[AD-A134917] N84-17582
WISCONSIN UNIV., MADISON.
Studies of silicon refractory metal interfaces: Photoemission study of interface formation and compound nucleation
[AD-A135340] N84-17358
Correlation of fracture toughness with tensile properties for irradiated 20% cold-worked 316 stainless steel
[DE84-003954] N84-17379
The time development of a blast wave with shock heated electrons
[NASA-CR-175364] N84-17529
A statistical-dynamical study of the large-scale intraseasonal variability of the northern hemisphere winter circulation N84-17716
Enhancement of SEASAT wind-stress measurements using data from GOES
[PB84-111244] N84-17773
Control theory of hyperbolic systems
[AD-A135146] N84-17952
Morphology and movements of polarization features on Venus
[NASA-CR-166464] N84-18137
Limits on diffuse X-ray emission from M101
[NASA-CR-173277] N84-18147
WISCONSIN UNIV., MILWAUKEE.
Numerical study of a separating and reattaching flow by using Reynolds-stress tubulence closure
[NASA-CR-166547] N84-17133
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
A compilation of moored current meter data from the western North Pacific. Volume 31, 1980 - 1982
[AD-A134234] N84-17796
Hydrographic station data of five surveys of the beta-triangle in the eastern North Atlantic, 1978 - 1981
[PB84-100874] N84-17800
WORLD METEOROLOGICAL ORGANIZATION, GENEVA (SWITZERLAND).
Guide to meteorological instruments and methods of observation
[WMO-8] N84-17764
WYOMING UNIV., LARAMIE.
A study of polymer matrix fatigue properties
[AD-A135076] N84-17294
Cloud physics investigations by the University of Wyoming in HIPLEX 1977-1982
[PB84-106756] N84-17770

Y

YORK UNIV., TORONTO (ONTARIO).
Incident velocity distributions on sampling electrodes of spacecraft plasma instruments N84-17267

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

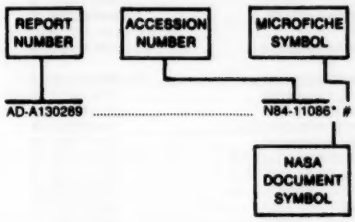
A-4638 ..... N84-17267
AF PROJ. ILIR N84-17390
N84-17731
AF PROJ. MOIE N84-17448
AF PROJ. TKG0 ..... N84-17205
AF PROJ. 3E1-63777-A-879 ..... N84-17826
AF PROJ. 3M1-61102-BS-10 ..... N84-17860
AF PROJ. 4A1-61102-B-52-C N84-17672
AF PROJ. 672-A N84-17206
AF PROJ. 1123 ..... N84-17190
N84-17191
AF PROJ. 2003 ..... N84-17180
N84-17911
AF PROJ. 2277 ..... N84-17492
AF PROJ. 2301 ..... N84-18054
AF PROJ. 2303 ..... N84-17304
N84-17391
N84-17393
N84-17594
AF PROJ. 2304 ..... N84-17179
N84-17484
N84-17536
N84-17537
N84-17624
N84-17887
N84-17902
N84-17904
N84-17905
N84-17927
N84-17928
N84-17930
N84-17945
N84-17946
N84-17947
N84-17948
N84-17949
N84-17950
N84-17951
N84-17952
N84-17953
N84-17954
N84-17955
N84-17956
N84-17958
N84-17959
N84-17984
N84-17986
N84-18027
N84-18091
N84-18104
N84-18105
N84-18106
AF PROJ. 2307 ..... N84-17146
N84-17538
N84-17539
N84-17545
N84-17548
AF PROJ. 2308 ..... N84-17303
AF PROJ. 2309 ..... N84-17738
AF PROJ. 2312 ..... N84-17822
AF PROJ. 2313 ..... N84-17839
N84-18049
AF PROJ. 2401 ..... N84-17296
N84-17623
N84-17629
AF PROJ. 2419 ..... N84-17401
AF PROJ. 2506 ..... N84-18068
AF PROJ. 3048 ..... N84-17157
N84-17542
N84-17543
N84-17544
AF PROJ. 4506 ..... N84-17451
AF PROJ. 4643 ..... N84-17731
N84-17732
AF PROJ. 5581 ..... N84-17909
AF PROJ. 6670 ..... N84-17577
N84-17578
AF PROJ. 6690 ..... N84-17733
AF PROJ. 6759 ..... N84-17442
AF PROJ. 7601 ..... N84-17289
AF PROJ. 7661 ..... N84-17281
AF-AFOSR-0005-81 ..... N84-17410
AF-AFOSR-0009-79 ..... N84-18054
AF-AFOSR-0009B-79 ..... N84-18054
AF-AFOSR-0018-79 ..... N84-17952
AF-AFOSR-0038-82 ..... N84-17956
AF-AFOSR-0123-79 ..... N84-17822
AF-AFOSR-0135-82 ..... N84-17954
AF-AFOSR-0144-82 ..... N84-17839
AF-AFOSR-0148-80 ..... N84-17539
AF-AFOSR-0152-82 ..... N84-17624
AF-AFOSR-0171-82 ..... N84-17536
AF-AFOSR-0173-80 ..... N84-17304
AF-AFOSR-0175-80 ..... N84-17950
AF-AFOSR-0188-81 ..... N84-17484
AF-AFOSR-0190-81 ..... N84-17948
AF-AFOSR-0197-81 ..... N84-17927
AF-AFOSR-0198-81 ..... N84-17946
N84-17947
N84-17958
AF-AFOSR-0204-80 ..... N84-17955
AF-AFOSR-0205-81 ..... N84-17904
N84-17986
N84-18105
AF-AFOSR-0212-80 ..... N84-17887
N84-17902
N84-18104
AF-AFOSR-0213-81 ..... N84-17146
AF-AFOSR-0221-81 ..... N84-17953
AF-AFOSR-0230-82 ..... N84-18091
AF-AFOSR-0246-82 ..... N84-17537
AF-AFOSR-0277-82 ..... N84-18027
AF-AFOSR-0304-82 ..... N84-17928
AF-AFOSR-0925-82 ..... N84-17303
AF-AFOSR-3271-77 ..... N84-18106
AF-AFOSR-3519-78 ..... N84-17951
AF-AFOSR-3633-78 ..... N84-17179
AF-F04701-82-C-0083 ..... N84-17254
AF-81-0198 ..... N84-17945
AF-82-0258 ..... N84-17949
ARPA ORDER 4031 ..... N84-17491
ARPA ORDER 4270 ..... N84-17456
ARPA ORDER 4395 ..... N84-18057
BM-J0275010 ..... N84-17685
BMFT-03-VM-018-A/C-027 ..... N84-17322
CHI PROJ. 793-R N84-18095
DA PROJ. 1L1-61102-AH-43 ..... N84-17546
N84-17579
DA PROJ. 1L1-61102-AH-45 ..... N84-17175
DA PROJ. 1L1-61102-AH-60 ..... N84-17625
DA PROJ. 1L1-62202-AH-85 ..... N84-17181
DA PROJ. 1L1-62209-AH-76 ..... N84-17176
DA PROJ. 1L1-62603-AH-18 ..... N84-17499
DA PROJ. 1L1-62618-AH-80 ..... N84-17150
DA PROJ. 1L1-62733-AH-20 ..... N84-17933
DA PROJ. 1T1-61102-BH-57 ..... N84-17943
DA PROJ. 1T1-62105-AH-84 ..... N84-17394
DA PROJ. 2Q1-61102-B-74-D N84-17932
DA PROJ. 3E1-62777-A-879 ..... N84-17824
DA PROJ. 4A1-61101-A-91-D N84-17671
DA PROJ. 4A1-61102-B-52-C N84-17438
N84-17675
DA PROJ. 4A7-62730-AT-42 ..... N84-17549
N84-17762
DA PROJ. 240-2 ..... N84-17153
DAAB07-78-A-6606 ..... N84-18103
DAAG24-83-K-0058 ..... N84-17410
DAAG29-77-G-0222 ..... N84-17306
DAAG29-79-C-0103 ..... N84-17832
DAAG29-79-C-0183 ..... N84-17308
DAAG29-80-C-0004 ..... N84-17631
DAAG29-80-C-0030 ..... N84-17965
DAAG29-80-C-0038 ..... N84-17735
DAAG29-80-C-0053 ..... N84-17311
DAAG29-80-C-0085 ..... N84-18073
DAAG29-80-C-0088 ..... N84-18070
DAAG29-80-C-0104 ..... N84-17487
DAAG29-80-C-0125 ..... N84-18069
DAAG29-80-K-0069 ..... N84-18071
DAAG29-80-K-0080 ..... N84-17490
DAAG29-80-K-0083 ..... N84-17889
DAAG29-80-K-0087 ..... N84-18072
DAAG29-81-D-0100 ..... N84-17150
N84-18048
DAAG29-81-K-0053 ..... N84-17443
DAAG29-81-K-0140 ..... N84-17358
DAAG29-81-K-0142 ..... N84-17873
DAAG29-81-K-0160 ..... N84-17910
N84-17987
DAAG29-82-K-0083 ..... N84-17489
DAAG29-82-K-0084 ..... N84-17444
DAAG29-82-K-0105 ..... N84-17960
DAAG29-82-K-0168 ..... N84-17961
DAAG46-77-C-0028 ..... N84-17400
DAAK10-83-D-0009 ..... N84-17148
DAAK11-82-C-0078 ..... N84-17541
DAAK51-82-C-0039 ..... N84-17176
DAAK70-79-C-0180 ..... N84-17913
DAAK70-81-C-0059 ..... N84-17670
DAAK70-81-C-0261 ..... N84-17676
DAAK70-82-C-0133 ..... N84-17907
DAJA37-81-C-0065 ..... N84-17932
DAJA37-82-C-0300 ..... N84-17943
DAJA37-82-C-0465 ..... N84-17593
DAJA45-83-C-0034 ..... N84-17799
DAJA45-83-M-0210 ..... N84-17674
DARPA ORDER 4100 ..... N84-17890
DARPA ORDER 4114 ..... N84-17561
DARPA ORDER 4856 ..... N84-17585
DASG60-78-L-0079 ..... N84-17960
DCA100-82-C-0026 ..... N84-17485
N84-17486
DE-AC02-76CH-00016 ..... N84-18034
N84-18037
DE-AC02-76ER-02383 ..... N84-17978
DE-AC02-76ER-03077 ..... N84-17976
N84-17977
DE-AC02-77CH-00178 ..... N84-17688
DE-AC02-80ER-10598 ..... N84-18076
DE-AC02-80EV-10488 ..... N84-17880
DE-AC02-81ER-10860 ..... N84-18023
DE-AC02-83CH-10093 ..... N84-17402
DE-AC03-76SF-00098 ..... N84-17566
N84-17975
N84-18022
N84-18042
N84-18080
DE-AC04-76DP-00053 ..... N84-17412
N84-17413
N84-17567
DE-AC04-76DP-00613 ..... N84-17382
N84-17862
DE-AC04-76DP-00789 ..... N84-17151
N84-17371
N84-17388
N84-17500
N84-17584
N84-17633
N84-17689
N84-17692
N84-17973
N84-18061
N84-18075
DE-AC06-76FF-02170 ..... N84-17368
N84-17379
DE-AC06-76RL-01857 ..... N84-17632
DE-AC09-76SF-00001 ..... N84-17550

DE-AI01-76ET-20320 ..... N84-17479
DE-AI01-77CS-51040 ..... N84-18117
DE-AM03-76SF-00034 ..... N84-18055
N84-18056
DE-AM03-76SF-00326 ..... N84-17317
DE-AS05-76ER-05940 ..... N84-18032
DE-AS05-79ER-10361 ..... N84-17740
DE-AS05-79ER-10419 ..... N84-18038
DE-AT03-76ER-70058 ..... N84-17320
DE-AT03-76ER-70088 ..... N84-17317
DE-AT03-80ER-52061 ..... N84-18055
DE-AT03-82ER-54010 ..... N84-18056
DE-AT03-82SF-11687 ..... N84-18045
DE-BM-J0-113009 ..... N84-17865
DE-FC01-79ER-10000 ..... N84-17690
N84-17693
DE-FG05-82ER-40058 ..... N84-18039
DEN3-32 ..... N84-18117
DFGH81-80-C-00143 ..... N84-17426
DI-BM-J0-113009 ..... N84-17868
N84-17867
N84-17866
DI-7-07-83-V0001 ..... N84-17770
DI-9-07-85-V0021 ..... N84-17782
DI-14-08-0001-19720 ..... N84-17723
DI-14-34-0001-1103 ..... N84-17684
DI-14-34-0001-2143 ..... N84-17767
DNA PROJ. T99-QAXL N84-17686
EG-77-C-01-4042 ..... N84-17688
EPA-R-806558 ..... N84-17713
EPA-R-8053365 ..... N84-17187
EPA-68-02-3066 ..... N84-17835
ESA-4730/81/D-JS(SC) N84-17243
ESA-4820/81/NL-PP(SC) N84-17507
N84-17508
ESA-4952/81/F-FC (SC) N84-17424
ESA-4952/81/F-FC(SC) N84-17423
ESA-4963/81/NL-MS N84-17505
N84-17506
ESA-5131/82/F-CG(SC) N84-17569
ESA-5154/82/NL-PP N84-17282
N84-17283
ESA-5182/82/F-CG(SC) N84-17683
ESTEC-2991/78/NL-AK(SC) N84-17241
ESTEC-3640/78/NL-AK N84-17242
ESTEC-4485/80/NL-MS(SC) N84-17465
N84-17466
ESTEC-4626/81/NL-MS(SC) N84-17463
N84-17464
ESTEC-4884/81/NL-AK(SC) N84-17285
ESTEC-5156/82/NL-PB(SC) N84-17284
ESTEC-5176/82/NL-PP N84-17765
F43-431 ..... N84-18009
F58-528 ..... N84-17825
F59-553 ..... N84-17240
F61-542 ..... N84-17356
F62-582 ..... N84-17483
F04701-77-C-0062 ..... N84-17262
F04701-82-C-0083 ..... N84-17359
N84-17411
N84-17580
F19628-80-C-0002 ..... N84-17447
N84-17454
F19628-80-C-0064 ..... N84-17732
F19628-80-C-0184 ..... N84-17577
N84-17578
F19628-80-C-0201 ..... N84-17289
F19628-81-C-0004 ..... N84-17442
F19628-81-K-0033 ..... N84-17733
F19628-81-K-0039 ..... N84-17738
F19628-81-K-0051 ..... N84-17731
F19628-82-C-0001 ..... N84-17448
N84-17891
F19628-83-C-0046 ..... N84-17492
F30602-80-C-0267 ..... N84-17909
F33615-78-C-2005 ..... N84-17542
N84-17543
N84-17544
F33615-79-C-1887 ..... N84-17180
F33615-79-C-2027 ..... N84-17157
F33615-79-C-5084 ..... N84-17390
F33615-81-C-0005 ..... N84-17190
N84-17191
F33615-81-C-3201 ..... N84-17629
F33615-81-C-5019 ..... N84-17393
F33615-81-K-0011 ..... N84-17828
F33615-82-M-3029 ..... N84-17545
F49620-77-C-0013 ..... N84-17548
F49620-78-C-0009 ..... N84-18068
F49620-79-C-0058 ..... N84-17984
F49620-79-C-0181 ..... N84-17929
F49620-80-C-0047 ..... N84-17391
F49620-80-C-0061 ..... N84-17594
F49620-81-C-0053 ..... N84-17538
F49620-81-K-0016 ..... N84-18049
F49620-82-C-0009 ..... N84-17959
F49620-82-C-0060 ..... N84-17930
F49620-82-K-0031 ..... N84-17905
F49629-83-C-0084 ..... N84-17936
JPL-953733 ..... N84-17260
MDA903-79-C-0680 ..... N84-17494
MDA903-80-C-0107 ..... N84-17494
N84-17888
MDA903-80-C-0432 ..... N84-17494
MDA903-81-C-0126 ..... N84-17890
MDA903-81-C-0166 ..... N84-18092
MDA903-82-C-0390 ..... N84-17456
MDA903-82-G-0055 ..... N84-17177
MDA903-83-C-0053 ..... N84-17561
MDA903-83-C-0335 ..... N84-17494
MO-A01-78-00-4331 ..... N84-17773
MVMA PROJ. 1161 ..... N84-17598
M0097PN N84-17562
NAGW-104 ..... N84-18138
NAGW-130 ..... N84-17137
NAGW-232 ..... N84-18139
NAGW-294 ..... N84-18142
NAG1-18 ..... N84-17520
NAG1-21 ..... N84-17437
NAG1-76 ..... N84-17140
NAG1-166 ..... N84-18017
NAG1-186 ..... N84-17977
NAG1-250 ..... N84-17171
NAG1-297 ..... N84-17532
NAG1-305 ..... N84-17172
NAG1-321 ..... N84-17616
NAG1-332 ..... N84-17478
NAG1-355 ..... N84-17941
NAG2-93 ..... N84-18137
NAG2-105 ..... N84-17526
NAG2-160 ..... N84-17133
NAG2-170 ..... N84-17852
NAG3-20 ..... N84-17258
NAG3-205 ..... N84-17410
NAG3-273 ..... N84-17139
NAG3-320 ..... N84-17252
NAG3-362 ..... N84-17606
NAG5-17 ..... N84-18026
NAG5-32 ..... N84-17722
NAG5-47 ..... N84-18122
NAG5-58 ..... N84-17755
NAG5-87 ..... N84-18121
NAG5-107 ..... N84-17729
NAG5-136 ..... N84-17726
NAG5-220 ..... N84-18066
NAG5-271 ..... N84-17642
NAG5-275 ..... N84-18120
NAG8-431 ..... N84-18147
NAONR-18-69 ..... N84-17363
NASA ORDER H-27954-B N84-17384
NASA ORDER S-10772-C N84-17641
NASW-3541 ..... N84-17302
N84-17804
NASW-3542 ..... N84-18016
NASW-3752 ..... N84-17369
NAS1-14566 ..... N84-17149
NAS1-15351 ..... N84-17130
NAS1-15648 ..... N84-17195
NAS1-16000 ..... N84-17136
N84-17899
NAS1-16304 ..... N84-17178
NAS1-16652 ..... N84-18047
NAS1-16756 ..... N84-17248
NAS1-16763 ..... N84-17558
NAS1-16978 ..... N84-18017
NAS1-17026 ..... N84-17131
NAS1-17027 ..... N84-17129
NAS1-17070 ..... N84-17118
N84-17119
N84-17621
N84-17899
NAS1-17130 ..... N84-17118
N84-17119
N84-17899
NAS2-6553 ..... N84-18136
NAS2-10961 ..... N84-17855
NAS2-11087 ..... N84-17856
NAS2-11129 ..... N84-17857
NAS2-11504 ..... N84-17936
NAS3-2271 ..... N84-17530
NAS3-22503 ..... N84-17477
NAS3-22536 ..... N84-17268
NAS3-23159 ..... N84-17481
NAS3-23167 ..... N84-17407
NAS4-2769 ..... N84-17173
N84-17174
NAS5-25690 ..... N84-17276
NAS5-25897 ..... N84-17725
NAS5-26658 ..... N84-17432
NAS5-26725 ..... N84-17480
NAS5-26962 ..... N84-17203
NAS7-100 ..... N84-17388
NAS8-33825 ..... N84-17167
NAS8-33881 ..... N84-17522
NAS8-33982 ..... N84-17262
N84-17276
NAS8-34263 ..... N84-17166
NAS8-34679 ..... N84-17249
NAS8-34746 ..... N84-17615
N84-17622
NAS8-34747 ..... N84-17196
NAS8-34938 ..... N84-17686
NAS8-34973 ..... N84-17287
NAS8-35036 ..... N84-17251
NAS8-35185 ..... N84-17574
NAS8-35339 ..... N84-17262
NAS9-12932 ..... N84-17820
NAS9-14523 ..... N84-17820
NAS9-14907 ..... N84-17523
NAS9-15487 ..... N84-17820
NAS9-16326 ..... N84-17820
N84-17821
NAS9-16443 ..... N84-17244
N84-17245
N84-17246
NAS9-16497 ..... N84-17435
NAS9-16582 ..... N84-17531
NAS9-16814 ..... N84-17556
NAS9-16850 ..... N84-17559
NAS9-16868 ..... N84-17431
NAS9-95519 ..... N84-17434
NA80SA-C-00830 ..... N84-17768
NA81AA-D-00069 ..... N84-17801
NBS-NB-805180 ..... N84-17327
NB81-NADA-2026 ..... N84-17162
NCCI-8 ..... N84-17575
NCC1-39 ..... N84-17697
NCC1-69 ..... N84-17189
NCC2-15 ..... N84-17528
NCC2-64 ..... N84-17527
NCC2-82 ..... N84-17519
NCC2-228 ..... N84-17859
NCC2-235 ..... N84-17858
NGL-05-002-105 ..... N84-17521
NGL-14-005-1817 ..... N84-17721
NGL-22-009-124 ..... N84-17988
NGL-33-018-003 ..... N84-17293
NGL-50-002-044 ..... N84-17529
NGR-06-003-176 ..... N84-18119
NGR-36-009-017 ..... N84-17168
NGR-39-007-011 ..... N84-17617
N84-17618
N84-17619
NGT-22-009-901 ..... N84-17526
NGT-47-020-801 ..... N84-17575
NR PROJ. 031-689 ..... N84-17365
N84-17366
NR PROJ. 056-749 ..... N84-17581
NR PROJ. 092-545 ..... N84-17309
NR PROJ. 229-046 ..... N84-17628
NR PROJ. 356-554 ..... N84-17399
NR PROJ. 356-577 ..... N84-17396
NR PROJ. 359-746 ..... N84-17305
NR PROJ. 627-802 ..... N84-17307
NR PROJ. 634-742 ..... N84-17360
NRL PROJ. 212-22 ..... N84-17493
NSF ATM 81-20371 ..... N84-17721
NSF ATM-8-300426 ..... N84-17276
NSF ATM-80-19563 ..... N84-17721
NSF ATM-81-17440 ..... N84-17721
NSF ATM-82-04041 ..... N84-17721
NSF ATM-82-18125 ..... N84-18142
NSF ATM-83-03172 ..... N84-18142
NSF CEE-81-19696 ..... N84-17747
NSF CME-79-18057 ..... N84-17639
NSF CME-80-06797 ..... N84-17554
NSF CPE-80-23182 ..... N84-17330
NSF DEB-82-07117 ..... N84-17946
NSF DPP-80-06922 ..... N84-17736
NSF DPP-81-20024 ..... N84-17736
NSF EAR-78-03654 ..... N84-17723
NSF EAR-81-15236 ..... N84-17728
NSF EAR-8115236 ..... N84-17723
NSF ENG-77-22756 ..... N84-17554
NSF ISP-80-19579 ..... N84-18112
NSF MCS-82-03405 ..... N84-17888
NSF MCS-82-05335 ..... N84-17945
N84-17946
NSF MCS-82-05355 ..... N84-17958
NSF MCS-83-02038 ..... N84-17908
NSF MEA-82-09083 ..... N84-17617
N84-17618
NSF OCE-80-15789 ..... N84-17800
NSF PHY-79-09146 ..... N84-18035
NSF PRA-79-20587 ..... N84-18095
N84-18096
NSF-67016628 ..... N84-18113
NSG-1206 ..... N84-18086

NSG-1342 ..... N84-18067
NSG-1567 ..... N84-17292
NSG-1568 ..... N84-17576
NSG-1655 ..... N84-17436
NSG-2118 ..... N84-17838
NSG-2387 ..... N84-18015
NSG-3150 ..... N84-17262
NSG-3155 ..... N84-17389
NSG-3246 ..... N84-17353
NSG-4008 ..... N84-17620
NSG-5270 ..... N84-17727
NSG-5348 ..... N84-17718
NSG-7092 ..... N84-18142
NSG-7469 ..... N84-18046
NSG-7479 ..... N84-17730
NSG-7506 ..... N84-17721
NSG-7592 ..... N84-18148
NSG-7610 ..... N84-17723
N84-17728
NTIA-910-8108 ..... N84-17471
N00014-75-C-0455 ..... N84-17957
N84-17962
N84-17985
N00014-75-C-0491 ..... N84-17455
N84-17969
N00014-75-C-0555 ..... N84-17440
N84-17944
N84-17983
N00014-75-C-0671 ..... N84-17309
N00014-75-C-0685 ..... N84-17396
N00014-75-C-0795 ..... N84-17399
N00014-76-C-0004 ..... N84-17797
N00014-76-C-0063 ..... N84-17630
N00014-76-C-0197 ..... N84-17796
N00014-76-C-0225 ..... N84-18007
N00014-76-C-0458 ..... N84-17365
N84-17366
N00014-77-C-0224 ..... N84-17988
N00014-77-C-0387 ..... N84-17357
N00014-77-C-0412 ..... N84-17421
N00014-77-C-0489 ..... N84-17757
N00014-77-C-0606 ..... N84-17790
N00014-78-C-0164 ..... N84-17908
N00014-79-C-0215 ..... N84-17840
N00014-79-C-0332 ..... N84-17806
N00014-79-C-0550 ..... N84-18019
N00014-79-C-0629 ..... N84-18052
N00014-79-C-0632 ..... N84-17392
N00014-79-C-0789 ..... N84-17483
N00014-80-C-0208 ..... N84-17942
N00014-80-C-0240 ..... N84-17582
N00014-80-C-0346 ..... N84-17310
N00014-80-C-0472 ..... N84-17581
N00014-80-C-0532 ..... N84-17305
N00014-80-C-0581 ..... N84-17843
N84-17844
N84-17846
N00014-80-C-0711 ..... N84-17398
N00014-80-C-0772 ..... N84-17607
N00014-80-K-0852 ..... N84-17314
N00014-81-C-0591 ..... N84-17841
N00014-81-C-0641 ..... N84-17295
N00014-81-C-2525 ..... N84-18074
N00014-81-K-0025 ..... N84-17364
N00014-81-K-0048 ..... N84-17842
N00014-81-K-0373 ..... N84-17455
N84-17969
N00014-81-K-0379 ..... N84-17977
N00014-81-K-0503 ..... N84-17861
N00014-81-K-0813 ..... N84-17496
N00014-82-C-0391 ..... N84-17535
N00014-82-C-0620 ..... N84-17960
N00014-82-C-0725 ..... N84-18050
N00014-82-C-2099 ..... N84-17315
N00014-82-K-0193 ..... N84-17908
N00014-82-K-0279 ..... N84-17833
N00014-82-K-0317 ..... N84-17307
N00014-82-K-0603 ..... N84-17497
N00014-82-K-0804 ..... N84-17628
N00014-83-C-0004 ..... N84-17805
N00014-83-C-0182 ..... N84-17540
N00014-83-C-0519 ..... N84-18028
N00014-83-G-0048 ..... N84-17901
N00014-83-K-0154 ..... N84-17360
N00014-83-M-0081 ..... N84-17441
N00014-83-M-0433 ..... N84-17441
N00019-81-C-0471 ..... N84-17367
N00024-80-C-5337 ..... N84-17626
N84-17627
N00039-81-C-0357 ..... N84-17445
N00039-81-K-0251 ..... N84-17491
N00174-81-C-0453 ..... N84-17312
N00228-82-C-6222 ..... N84-17240
N62269-80-C-0278 ..... N84-17294
N62269-81-C-0153 ..... N84-17395
PHS-MH-29791 ..... N84-17850
PHS-MH-34188 ..... N84-17809
RR0-1400 ..... N84-17970
RR0-3204 ..... N84-17964
RR0-4209 ..... N84-18019
RR01109 ..... N84-18030
RR0230141 ..... N84-17968
R02204001 ..... N84-17395
SR0140301 ..... N84-18020
TENRAC PROJ. 82-S-U-1 ..... N84-17691
TEXAS A&M RES. PROJ. 4022D-03 ..... N84-17740
W-31-109-ENG-38 ..... N84-17369
N84-17373
N84-17375
N84-17378
N84-17380
N84-17381
N84-17502
N84-17611
N84-17679
N84-17699
N84-17701
N84-17807
N84-18036
N84-18040
N84-18041
N84-18078
N84-18079
N84-18081
W-7405-ENG-26 ..... N84-17297
N84-17370
N84-17372
N84-17374
N84-17376
N84-17377
N84-17403
N84-17597
N84-17677
N84-17678
N84-17700
N84-17702
N84-17703
N84-18024
N84-18033
N84-18035
N84-18094
W-7405-ENG-36 ..... N84-17316
N84-17318
N84-17319
N84-17551
N84-17739
N84-18058
N84-18059
N84-18077
N84-18093
N84-18110
N84-18143
W-7405-ENG-48 ..... N84-17404
N84-17501
N84-17564
N84-17565
N84-17568
N84-17585
N84-17914
N84-17972
N84-17974
N84-18012
N84-18031
N84-18057
N84-18060
N84-18062
N84-18063
N84-18084
W-7405-ENG-82 ..... N84-17971
WO04-77 ..... N84-17906
W05-98 ..... N84-17906
W1253 ..... N84-17453
146-40-05-05 ..... N84-17784
199-20-76-01 ..... N84-18044
505-31-0A N84-17138
505-31-03-01 ..... N84-17127
505-31-13-05 ..... N84-17534
505-31-21 ..... N84-17144
N84-17250
505-31-23-08 ..... N84-17132
505-31-42 ..... N84-17142
N84-17410
505-31-53-10 ..... N84-17136
505-31-83-02 ..... N84-17900
505-32-52 ..... N84-17533
N84-17590
505-33-1A N84-17353
N84-17354
505-33-1B N84-17591
N84-17592
505-33-22 ..... N84-17350
505-33-43-07 ..... N84-17135
505-33-53-09 ..... N84-17175
505-33-53-14 ..... N84-17560
505-33-54 ..... N84-17173
N84-17174
505-34-03-02 ..... N84-17186
505-34-03-05 ..... N84-17185
505-40-1A N84-17143
505-40-02 ..... N84-17525
505-42-01 ..... N84-18102
505-43-13-01 ..... N84-17184
505-43-23-02 ..... N84-17134
505-45-1A N84-17139
506-53-1A N84-17806
506-53-1B N84-17352
N84-17982
506-53-113 ..... N84-17351
506-55-13-01 ..... N84-17575
506-62-43-91 ..... N84-17211
506-64-31 ..... N84-17855
N84-17856
N84-17857
532-06-13-03 ..... N84-18018
534-04-13-52 ..... N84-17165
776-33-41 ..... N84-17479
776-33-41-02 ..... N84-18017

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-1983-3 ..... N84-17921 #
A-9514 ..... N84-17144* #
A-9560 ..... N84-18152* #
A-9603 ..... N84-17141* #
A-9604 ..... N84-17137* #

AAE-84-1 ..... N84-17140* #

ACT-TR-8147 ..... N84-17312 #

AD-A134182 ..... N84-18133 #
AD-A134195 ..... N84-17315 #
AD-A134234 ..... N84-17796 #
AD-A134244 ..... N84-17797 #
AD-A134272 ..... N84-18109 #
AD-A134311 ..... N84-17842 #
AD-A134319 ..... N84-17456 #
AD-A134324 ..... N84-17843 #
AD-A134335 ..... N84-17844 #
AD-A134358 ..... N84-17806 #
AD-A134404 ..... N84-17845 #
AD-A134415 ..... N84-17846 #
AD-A134428 ..... N84-17798 #
AD-A134444 ..... N84-17831 #
AD-A134458 ..... N84-17583 #
AD-A134501 ..... N84-17738 #
AD-A134575 ..... N84-17832 #
AD-A134576 ..... N84-17833 #
AD-A134599 ..... N84-17799 #
AD-A134615 ..... N84-17446 #
AD-A134616 ..... N84-17561 #
AD-A134617 ..... N84-17735 #
AD-A134628 ..... N84-17491 #
AD-A134629 ..... N84-17121 #
AD-A134636 ..... N84-17398 #
AD-A134651 ..... N84-17673 #
AD-A134653 ..... N84-17823 #
AD-A134661 ..... N84-18092 #
AD-A134663 ..... N84-17311 #
AD-A134670 ..... N84-18073 #
AD-A134672 ..... N84-17824 #
AD-A134673 ..... N84-17965 #
AD-A134674 ..... N84-17805 #
AD-A134683 ..... N84-17447 #
AD-A134691 ..... N84-17542 #
AD-A134692 ..... N84-17543 #
AD-A134693 ..... N84-17544 #
AD-A134694 ..... N84-18030 #
AD-A134695 ..... N84-17180 #
AD-A134696 ..... N84-17966 #
AD-A134698 ..... N84-17908 #
AD-A134700 ..... N84-17545 #
AD-A134701 ..... N84-17909 #
AD-A134702 ..... N84-17791 #
AD-A134704 ..... N84-17312 #
AD-A134705 ..... N84-18052 #
AD-A134707 ..... N84-17448 #
AD-A134711 ..... N84-17449 #
AD-A134713 ..... N84-17492 #
AD-A134714 ..... N84-17411 #
AD-A134715 ..... N84-17792 #
AD-A134716 ..... N84-17450 #
AD-A134717 ..... N84-17840 #
AD-A134728 ..... N84-17933 #
AD-A134729 ..... N84-17364 #
AD-A134730 ..... N84-17451 #
AD-A134739 ..... N84-17150 #
AD-A134740 ..... N84-17579 #
AD-A134742 ..... N84-17546 #
AD-A134743 ..... N84-17452 #
AD-A134744 ..... N84-17493 #
AD-A134745 ..... N84-17122 #
AD-A134746 ..... N84-17910 #
AD-A134748 ..... N84-17987 #
AD-A134749 ..... N84-17399 #
AD-A134750 ..... N84-17609 #
AD-A134751 ..... N84-18010 #
AD-A134752 ..... N84-17967 #
AD-A134753 ..... N84-17280 #
AD-A134757 ..... N84-17968 #
AD-A134762 ..... N84-18074 #
AD-A134767 ..... N84-17628 #
AD-A134773 ..... N84-18020 #
AD-A134774 ..... N84-17453 #
AD-A134776 ..... N84-18011 #
AD-A134782 ..... N84-17825 #
AD-A134783 ..... N84-17400 #
AD-A134791 ..... N84-17793 #
AD-A134792 ..... N84-17794 #
AD-A134794 ..... N84-17547 #
AD-A134796 ..... N84-17548 #
AD-A134797 ..... N84-17841 #
AD-A134799 ..... N84-17197 #
AD-A134806 ..... N84-17365 #
AD-A134807 ..... N84-17366 #
AD-A134809 ..... N84-17494 #
AD-A134810 ..... N84-17205 #
AD-A134811 ..... N84-17826 #
AD-A134812 ..... N84-17495 #
AD-A134814 ..... N84-17827 #
AD-A134819 ..... N84-17496 #
AD-A134820 ..... N84-17206 #
AD-A134826 ..... N84-17795 #
AD-A134828 ..... N84-17860 #
AD-A134833 ..... N84-17154 #
AD-A134834 ..... N84-17155 #
AD-A134836 ..... N84-17367 #
AD-A134837 ..... N84-17497 #
AD-A134838 ..... N84-17498 #
AD-A134839 ..... N84-17181 #
AD-A134843 ..... N84-17182 #
AD-A134845 ..... N84-17629 #
AD-A134850 ..... N84-17454 #
AD-A134853 ..... N84-17828 #
AD-A134854 ..... N84-17191 #
AD-A134857 ..... N84-17911 #
AD-A134860 ..... N84-17156 #
AD-A134861 ..... N84-17674 #
AD-A134864 ..... N84-17595 #
AD-A134865 ..... N84-17401 #
AD-A134866 ..... N84-17580 #
AD-A134868 ..... N84-17630 #
AD-A134870 ..... N84-17912 #
AD-A134871 ..... N84-17736 #
AD-A134872 ..... N84-17737 #
AD-A134875 ..... N84-17581 #
AD-A134882 ..... N84-17562 #
AD-A134883 ..... N84-17157 #
AD-A134886 ..... N84-18021 #
AD-A134888 ..... N84-17762 #
AD-A134889 ..... N84-17631 #
AD-A134891 ..... N84-17207 #
AD-A134892 ..... N84-17829 #
AD-A134893 ..... N84-17549 #
AD-A134894 ..... N84-17281 #
AD-A134898 ..... N84-17158 #
AD-A134899 ..... N84-17861 #
AD-A134912 ..... N84-17830 #
AD-A134917 ..... N84-17582 #
AD-A134923 ..... N84-17563 #
AD-A134930 ..... N84-17891 #
AD-A134934 ..... N84-17934 #
AD-A134940 ..... N84-17313 #
AD-A134942 ..... N84-17596 #
AD-A134952 ..... N84-17913 #
AD-A134955 ..... N84-17198 #
AD-A134957 ..... N84-17199 #
AD-A134965 ..... N84-17675 #
AD-A134970 ..... N84-17969 #
AD-A134974 ..... N84-18108 #
AD-A134977 ..... N84-17676 #
AD-A134981 ..... N84-17970 #
AD-A134982 ..... N84-17455 #
AD-A134988 ..... N84-17314 #
AD-A134991 ..... N84-17499 #
AD-A134993 ..... N84-17120 #
AD-A134997 ..... N84-17288 #
AD-A134998 ..... N84-18048 #
AD-A134999 ..... N84-17670 #
AD-A135001 ..... N84-17901 #
AD-A135003 ..... N84-17865 #
AD-A135006 ..... N84-17438 #
AD-A135007 ..... N84-17483 #
AD-A135012 ..... N84-17623 #
AD-A135021 ..... N84-17439 #
AD-A135023 ..... N84-17440 #
AD-A135024 ..... N84-17886 #
AD-A135032 ..... N84-17942 #
AD-A135041 ..... N84-17441 #
AD-A135050 ..... N84-17943 #
AD-A135051 ..... N84-17289 #
AD-A135052 ..... N84-17190 #
AD-A135059 ..... N84-17577 #
AD-A135060 ..... N84-17578 #
AD-A135061 ..... N84-17944 #
AD-A135066 ..... N84-17983 #
AD-A135067 ..... N84-17593 #
AD-A135068 ..... N84-17390 #
AD-A135072 ..... N84-17179 #
AD-A135073 ..... N84-17145 #
AD-A135074 ..... N84-17927 #
AD-A135076 ..... N84-17294 #
AD-A135088 ..... N84-17303 #
AD-A135089 ..... N84-17421 #
AD-A135092 ..... N84-17945 #
AD-A135093 ..... N84-17946 #
AD-A135102 ..... N84-18068 #
AD-A135105 ..... N84-17887 #
AD-A135107 ..... N84-17391 #
AD-A135108 ..... N84-17304 #
AD-A135109 ..... N84-17947 #
AD-A135110 ..... N84-17948 #
AD-A135111 ..... N84-17624 #
AD-A135115 ..... N84-17949 #
AD-A135117 ..... N84-17950 #
AD-A135118 ..... N84-17535 #
AD-A135120 ..... N84-18027 #
AD-A135121 ..... N84-17928 #
AD-A135124 ..... N84-17484 #
AD-A135133 ..... N84-17146 #
AD-A135134 ..... N84-17951 #
AD-A135143 ..... N84-17731 #
AD-A135144 ..... N84-17442 #
AD-A135146 ..... N84-17952 #
AD-A135150 ..... N84-17176 #
AD-A135152 ..... N84-17536 #
AD-A135153 ..... N84-17929 #
AD-A135154 ..... N84-17953 #
AD-A135172 ..... N84-17537 #
AD-A135173 ..... N84-18054 #
AD-A135174 ..... N84-17732 #
AD-A135175 ..... N84-17954 #
AD-A135177 ..... N84-17955 #
AD-A135202 ..... N84-17888 #
AD-A135208 ..... N84-17984 #
AD-A135210 ..... N84-17733 #
AD-A135212 ..... N84-17538 #
AD-A135223 ..... N84-18091 #
AD-A135224 ..... N84-17392 #
AD-A135232 ..... N84-17485 #
AD-A135233 ..... N84-17486 #
AD-A135240 ..... N84-17356 #
AD-A135241 ..... N84-17757 #
AD-A135248 ..... N84-17295 #
AD-A135251 ..... N84-17147 #
AD-A135252 ..... N84-17443 #
AD-A135255 ..... N84-17444 #

AD-A135256 N84-17146 #
AD-A135257 N84-17930 #
AD-A135259 N84-18103 #
AD-A135265 N84-17956 #
AD-A135275 N84-17957 #
AD-A135278 N84-17393 #
AD-A135281 N84-18069 #
AD-A135282 N84-17394 #
AD-A135283 N84-17487 #
AD-A135294 N84-17958 #
AD-A135297 N84-17357 #
AD-A135298 N84-17889 #
AD-A135299 N84-18104 #
AD-A135303 N84-17902 #
AD-A135314 N84-17959 #
AD-A135318 N84-17153 #
AD-A135319 N84-17488 #
AD-A135325 N84-17903 #
AD-A135335 N84-17489 #
AD-A135336 N84-18070 #
AD-A135337 N84-17960 #
AD-A135338 N84-18071 #
AD-A135339 N84-18009 #
AD-A135340 N84-17358 #
AD-A135345 N84-17625 #
AD-A135353 N84-18072 #
AD-A135363 N84-17687 #
AD-A135372 N84-17961 #
AD-A135373 N84-17305 #
AD-A135375 N84-17758 #
AD-A135382 N84-17759 #
AD-A135383 N84-17306 #
AD-A135385 N84-17962 #
AD-A135386 N84-17307 #
AD-A135387 N84-17626 #
AD-A135388 N84-17627 #
AD-A135389 N84-17490 #
AD-A135390 N84-17395 #
AD-A135392 N84-17308 #
AD-A135415 N84-17309 #
AD-A135416 N84-17296 #
AD-A135419 N84-17671 #
AD-A135420 N84-18007 #
AD-A135429 N84-17396 #
AD-A135431 N84-17607 #
AD-A135432 N84-17310 #
AD-A135435 N84-17963 #
AD-A135438 N84-18049 #
AD-A135441 N84-17760 #
AD-A135442 N84-17931 #
AD-A135445 N84-17985 #
AD-A135446 N84-18050 #
AD-A135449 N84-17932 #
AD-A135451 N84-17672 #
AD-A135452 N84-18105 #
AD-A135453 N84-18106 #
AD-A135454 N84-17539 #
AD-A135458 N84-17986 #
AD-A135459 N84-17904 #
AD-A135460 N84-17822 #
AD-A135461 N84-17839 #
AD-A135463 N84-17540 #
AD-A135464 N84-17594 #
AD-A135465 N84-17890 #
AD-A135466 N84-17240 #
AD-A135476 N84-17905 #
AD-A135481 N84-17359 #
AD-A135482 N84-17445 #
AD-A135484 N84-17790 #
AD-A135493 N84-17360 #
AD-A135502 N84-18019 #
AD-A135504 N84-18051 #
AD-A135512 N84-17630 #
AD-A135514 N84-17204 #
AD-A135515 N84-17201 #
AD-A135516 N84-17361 #
AD-A135518 N84-18107 #
AD-A135521 N84-17177 #
AD-A135522 N84-17906 #
AD-A135532 N84-17907 #
AD-A135533 N84-18028 #
AD-A135537 N84-17964 #
AD-A135538 N84-17734 #
AD-A135543 N84-17541 #
AD-A135546 N84-17397 #
AD-A135547 N84-18029 #
AD-A135548 N84-17362 #
AD-A135549 N84-17363 #
AD-A135555 N84-17149* #
AD-A135556 N84-17761 #

AD-E000548 N84-17493 #
AD-E000549 N84-17280 #
AD-E000550 N84-17399 #
AD-E000550 N84-17609 #
AD-E000550 N84-17967 #
AD-E000550 N84-17968 #
AD-E000550 N84-18010 #
AD-E301230 N84-17364 #
AD-E301230 N84-17451 #
AD-E301230 N84-17933 #
AD-E301231 N84-17547 #
AD-E301231 N84-17793 #
AD-E301231 N84-17794 #
AD-E301247 N84-17450 #
AD-E301247 N84-17792 #
AD-E301247 N84-17840 #
AD-E301256 N84-17441 #
AD-E401102 N84-17314 #
AD-E401102 N84-17455 #
AD-E401102 N84-17970 #
AD-E440201 N84-17625 #
AD-E850383 N84-17761 #
AD-E850416 N84-17315 #
AD-E950457 N84-17452 #

AD-F300339 N84-17546 #
AD-F300341 N84-17150 #
AD-F300344 N84-17579 #
AD-F300347 N84-17499 #
AD-F630168 N84-17841 #

AD-TR-83-42 N84-17205 #
AD-TR-83-46 N84-17207 #

AEDC-TR-83-1 N84-17288 #

AFGL-ERP-825 N84-17281 #

AFGL-TR-83-0046 N84-17281 #
AFGL-TR-83-0070 N84-17738 #
AFGL-TR-83-0191-VOL-1 N84-17577 #
AFGL-TR-83-0191-VOL-2 N84-17578 #
AFGL-TR-83-0209 N84-17732 #
AFGL-TR-83-0233 N84-17289 #
AFGL-TR-83-0253 N84-17733 #
AFGL-TR-0196 N84-17731 #

AFGWC/TN-82/003 N84-17761 #

AFHRL-TP-83-6 N84-17828 #
AFHRL-TP-83-38 N84-17191 #

AFHRL-TR-83-22 N84-17190 #

AFIT-LSSR-39-83 N84-17120 #
AFIT-LSSR-45-83 N84-17198 #
AFIT-LSSR-51-83 N84-17845 #
AFIT-LSSR-61-83 N84-18108 #
AFIT-LSSR-85-83 N84-17885 #
AFIT-LSSR-86-83 N84-17199 #

AFIT/CI/NR-83-59D N84-17931 #
AFIT/CI/NR-83-60D N84-17760 #
AFIT/CI/NR-83-63T N84-17759 #
AFIT/CI/NR-83-66D N84-17687 #
AFIT/CI/NR-83-69D N84-17963 #

AFOSR-83-0873TR N84-17303 #
AFOSR-83-0877TR N84-17930 #
AFOSR-83-0878TR N84-17951 #
AFOSR-83-0879TR N84-18054 #
AFOSR-83-0881TR N84-17952 #
AFOSR-83-0896TR N84-17146 #
AFOSR-83-0900TR N84-17304 #
AFOSR-83-0905TR N84-17958 #
AFOSR-83-0906TR N84-17945 #
AFOSR-83-0907TR N84-18068 #
AFOSR-83-0921TR N84-17391 #
AFOSR-83-0923TR N84-17538 #
AFOSR-83-0926TR N84-17947 #
AFOSR-83-0927TR N84-17946 #
AFOSR-83-0928TR N84-17536 #
AFOSR-83-0929TR N84-17537 #
AFOSR-83-0930TR N84-17927 #
AFOSR-83-0931TR N84-17548 #
AFOSR-83-0932TR N84-17953 #
AFOSR-83-0934TR N84-17955 #
AFOSR-83-0935TR N84-17984 #
AFOSR-83-0936TR N84-18091 #
AFOSR-83-0944TR N84-17950 #
AFOSR-83-0945TR N84-18027 #
AFOSR-83-0949TR N84-17624 #
AFOSR-83-0952TR N84-17928 #
AFOSR-83-0954TR N84-17949 #
AFOSR-83-0955TR N84-17948 #
AFOSR-83-0959TR N84-17887 #
AFOSR-83-0960TR N84-18104 #
AFOSR-83-0961TR N84-17902 #
AFOSR-83-0967TR N84-17484 #
AFOSR-83-0969TR N84-17905 #
AFOSR-83-0971TR N84-17956 #
AFOSR-83-0975TR N84-17959 #
AFOSR-83-0981TR N84-17179 #
AFOSR-83-0982TR N84-17954 #
AFOSR-83-0983TR N84-18106 #
AFOSR-83-0987TR N84-17594 #
AFOSR-83-0989TR N84-17904 #
AFOSR-83-0990TR N84-17986 #
AFOSR-83-0993TR N84-18105 #
AFOSR-83-0999TR N84-17822 #
AFOSR-83-1015TR N84-18049 #
AFOSR-83-1016TR N84-17839 #
AFOSR-83-1024TR N84-17539 #

AFSCOM-TR-83-C-8 N84-17590* #

AFWAL-TR-82-3109 N84-17629 #
AFWAL-TR-83-1058 N84-17911 #
AFWAL-TR-83-1106 N84-17180 #
AFWAL-TR-83-2021-VOL-2 N84-17157 #
AFWAL-TR-83-2044 N84-17542 #
AFWAL-TR-83-2044-PT-2 N84-17543 #
AFWAL-TR-83-2044-PT-3 N84-17544 #
AFWAL-TR-83-3071 N84-17545 #
AFWAL-TR-83-3083 N84-17153 #
AFWAL-TR-83-3086 N84-17296 #
AFWAL-TR-83-3096 N84-17623 #
AFWAL-TR-83-4010 N84-17401 #
AFWAL-TR-83-4055 N84-17393 #
AFWAL-TR-83-4080 N84-17390 #

AFWL-TR-83-97 N84-17206 #

AIAA-83-2704 N84-17250* #

AMMRC-TR-83-44 N84-17400 #
AMMRC-TR-83-53 N84-17394 #

ANAMET-1082.1A N84-17629 #

ANL-CT-83-6 N84-17502 #

APML-150983 N84-17311 #

APR-2 N84-17858* #
APR-2 N84-17859* #
APR-125 N84-17488 #

AR-1 N84-17628 #
AR-002-954 N84-17128 #
AR-003-297 N84-17301 #
AR-003-307 N84-17482 #
AR-003-309 N84-17408 #
AR-003-798 N84-17803 #
AR-003-800 N84-17557 #
AR-003-801 N84-17524 #
AR-003-809 N84-17387 #

ARB-R-83/217 N84-17714 #

ARBRL-CR-00517 N84-17150 #

ARBRL-TR-02526 N84-17546 #
ARBRL-TR-02527 N84-17579 #
ARBRL-TR-02530 N84-17499 #

ARCSL-CR-83062 N84-17541 #

ARI-TR-575 N84-17932 #

ARL-AERO-REPT-158 N84-17128 #

ARL-TR-82-68 N84-17435* #

ARLCB-TR-83024 N84-17625 #

ARO-15486.17-MA N84-17306 #
ARO-16178.6-GS N84-17735 #
ARO-16272.2-LS N84-17832 #
ARO-16537.19-MA N84-17306 #
ARO-16807.12-MA N84-17965 #
ARO-16836.1-EL N84-18069 #
ARO-16859.19-EL N84-17490 #
ARO-16865.13-CH N84-17311 #
ARO-16869.7-PH N84-18073 #
ARO-16936.1-EL N84-18070 #
ARO-17209.59-EL N84-17487 #
ARO-17683.16-EL N84-18072 #
ARO-17687.15-EL-A N84-18071 #
ARO-17735.25-EL N84-17443 #
ARO-17808.4-GS N84-17673 #
ARO-17920.13-EL N84-17889 #
ARO-18054.9-EL N84-17444 #
ARO-18195.5-MA N84-17987 #
ARO-18195.6-MA N84-17910 #
ARO-18239.5-PH N84-17358 #
ARO-18619.1-EL N84-17489 #

ARO-18898.3-MA ..... N84-17960 #
ARO-19367.8-MA ..... N84-17961 #

AS-142 ..... N84-17770 #

ASL-TR-1054 ..... N84-17390 #

ATR-1 ..... N84-17905 #

AVRADCOM-TR-84-C-2 ..... N84-17592* #

AVSCOM-TR-83-B-1 ..... N84-18018* #
AVSCOM-TR-83-B-7 ..... N84-17175* #
AVSCOM-TR-83-C-6 ..... N84-17350* #

AVSD-0343-83-RR ..... N84-17148 #

B-205335 ..... N84-17286 #
B-212184 ..... N84-18097 #

BDM/W-83-610-TR ..... N84-17561 #

BDX-613-2992 ..... N84-17862 #
BDX-613-3001 ..... N84-17382 #

BLL-LTS-1200/83-(5828.4F) N84-17386

BLL-M-35373 ..... N84-17414
BLL-M-35384-(5828.4) ..... N84-17415 #
BLL-M-35385-(5828.4) ..... N84-17344 #
BLL-M-35387-(5828.4) ..... N84-17343 #
BLL-M-35391-(5828.4) ..... N84-17589 #
BLL-M-35430-(5828.4) ..... N84-17342 #
BLL-M-35433-(5828.4) ..... N84-17612 #
BLL-M-35437-(5828.4) ..... N84-17513 #
BLL-M-35452-(5828.4) N84-17613

BLL-MO-TRANS-1570-(9022.552) ..... N84-17753 #

BLL-OA-TRANS-3093-(6196.3) ..... N84-17336 #
BLL-OA-TRANS-3121-(6196.3) ..... N84-17512 #
BLL-OA-TRANS-3126-(6196.3) ..... N84-18053 #
BLL-OA-TRANS-3127-(6196.3) ..... N84-17340 #
BLL-OA-TRANS-3134-(6196.3) ..... N84-17337 #
BLL-OA-TRANS-3136-(6196.3) ..... N84-17338 #
BLL-OA-TRANS-3137-(6196.3) ..... N84-17339 #
BLL-OA-TRANS-3139-(6196.3) ..... N84-17476 #
BLL-OA-TRANS-3149-(6196.3) ..... N84-17291 #
BLL-OA-TRANS-3162-(6196.3) ..... N84-17334 #
BLL-OA-TRANS-3168-(6169.3) ..... N84-17335 #
BLL-OA-TRANS-3181-(6196.3) N84-17514

BLL-RISLEY-TR-4854-(9091.9F) ..... N84-17298 #
BLL-RISLEY-TR-4858-(9091.9F) N84-17299
BLL-RISLEY-TR-4871-(9091.9F) N84-17188
BLL-RISLEY-TR-4880-(9091.9F) ..... N84-17341 #

BLL-TRANS-1098-(7291.796S) ..... N84-17300 #
BLL-TRANS-1568-(9022.552) ..... N84-17751 #
BLL-TRANS-1571-(9022.552) ..... N84-17752 #

BM-OFR-177(1)-83 ..... N84-17865 #
BM-OFR-177(2)-83 ..... N84-17866 #
BM-OFR-177(3)-83 ..... N84-17867 #
BM-OFR-177(4)-83 ..... N84-17868 #
BM-OFR-179-83 ..... N84-17869 #
BM-OFR-202-83 ..... N84-17685 #

BMFT-FB-T-83-178 ..... N84-17383 #
BMFT-FB-T-83-179 ..... N84-17321 #
BMFT-FB-T-83-198 ..... N84-17183 #
BMFT-FB-T-83-199 ..... N84-17322 #
BMFT-FB-T-83-201 ..... N84-17704 #
BMFT-FB-T-83-207 ..... N84-17696 #
BMFT-FB-T-83-208 ..... N84-17323 #

BMFT-FB-W-83-016 ..... N84-18124 #
BMFT-FB-W-83-021 ..... N84-17504 #
BMFT-FB-W-83-024 ..... N84-17694 #
BMFT-FB-W-83-029 ..... N84-17695 #

BMVG-FBWT-83-1 ..... N84-17915 #

BNL-33824 ..... N84-18034 #
BNL-33864 ..... N84-18037 #

BR-ROS-ME-MA00/06 ..... N84-17209

BULL-189 ..... N84-18125 #
BULL-191 ..... N84-18126 #

CERC-83-3 ..... N84-17791 #

CFDL-TR-83-5 ..... N84-17526* #
CFDL-TR-83-7 ..... N84-18090* #

CISE-1795 ..... N84-18016* #

CMU-RI-TR-83-2 ..... N84-17595 #
CMU-RI-TR-83-15 ..... N84-17861 #
CMU-RI-TR-83-16 ..... N84-17596 #
CMU-RI-TR-83-17 ..... N84-17934 #

CONF-820475 ..... N84-18039 #
CONF-820906-38 ..... N84-17688 #
CONF-820980-8 ..... N84-18032 #
CONF-830311-193 ..... N84-18036 #
CONF-830390-2 ..... N84-18033 #
CONF-830456-2 ..... N84-18077 #
CONF-830456-3-REV ..... N84-17566 #
CONF-830621-45 ..... N84-17501 #
CONF-830659-16 ..... N84-17372 #
CONF-830706-8 ..... N84-18035 #
CONF-830711-7 ..... N84-17297 #
CONF-830719-58 ..... N84-17360* #
CONF-830763-9 ..... N84-17316 #
CONF-830795-4 ..... N84-17373 #
CONF-830798-6 ..... N84-18037 #
CONF-830811-18 ..... N84-18084 #
CONF-830847-6 ..... N84-17678 #
CONF-830847-7 ..... N84-17597 #
CONF-830852-2 ..... N84-17551 #
CONF-830859-10 ..... N84-17975 #
CONF-830874-30 ..... N84-17565 #
CONF-830911-35 ..... N84-18057 #
CONF-830911-36 ..... N84-18042 #
CONF-830942-58 ..... N84-17368 #
CONF-830942-62 ..... N84-17377 #
CONF-830942-63 ..... N84-17376 #
CONF-830942-65 ..... N84-17370 #
CONF-830942-67 ..... N84-17374 #
CONF-830942-68 ..... N84-17379 #
CONF-830972-1 ..... N84-17739 #
CONF-830990-2 ..... N84-17402 #
CONF-831011-4 ..... N84-18040 #
CONF-831015-26 ..... N84-18022 #
CONF-831048-1 ..... N84-17703 #
CONF-831048-2 ..... N84-17702 #
CONF-831065-1 ..... N84-18034 #
CONF-831105-4 ..... N84-18060 #
CONF-831174-15 ..... N84-18075 #
CONF-831174-28 ..... N84-18063 #
CONF-831174-30 ..... N84-17371 #
CONF-831174-36 ..... N84-17403 #
CONF-831174-39 ..... N84-18081 #
CONF-831174-40 ..... N84-17380 #
CONF-831174-41 ..... N84-17404 #
CONF-831174-44 ..... N84-17375 #
CONF-831174-46 ..... N84-17388* #
CONF-831174-47 ..... N84-18079 #
CONF-831180-2 ..... N84-18031 #
CONF-831187-13 ..... N84-18078 #
CONF-831195-2 ..... N84-17564 #
CONF-831195-3 ..... N84-17319 #
CONF-831203-20 ..... N84-17568 #
CONF-831203-21 ..... N84-18062 #
CONF-831203-26 ..... N84-18061 #
CONF-831247-1 ..... N84-17914 #
CONF-831248-1 ..... N84-17692 #
CONF-840119-1 ..... N84-17973 #
CONF-840119-2 ..... N84-17550 #
CONF-8306121-5 ..... N84-17585 #
CONF-8306143-1 ..... N84-17500 #
CONF-8308115-2 ..... N84-17700 #
CONF-8308136-2 ..... N84-18143 #
CONF-8309130-4 ..... N84-17701 #
CONF-8309156-13 ..... N84-18041 #
CONF-8310111-9 ..... N84-17413 #
CONF-8310143-63 ..... N84-18024 #
CONF-8310143-65 ..... N84-17381 #
CONF-8310159-8 ..... N84-17412 #
CONF-8310163-9 ..... N84-17584 #
CONF-8310172-8 ..... N84-18080 #
CONF-8310182-3 ..... N84-18110 #
CONF-8310187-1 ..... N84-17632 #
CONF-8310199-3 ..... N84-17679 #
CONF-8310201-2 ..... N84-17317 #
CONF-8310205-3 ..... N84-17378 #
CONF-8310220-1 ..... N84-17699 #
CONF-8310221-1 ..... N84-17807 #

COO-2383-0093 ..... N84-17978 #

CRJP-249 ..... N84-17841 #

CRREL-SR-83-10 ..... N84-17762 #
CRREL-SR-83-12 ..... N84-17737 #
CRREL-SR-83-13 ..... N84-17736 #

CRREL-83-12 ..... N84-17549 #
CRREL-83-14 ..... N84-17631 #
CRREL-83-21 ..... N84-17798 #

CRREL-83-22 ..... N84-17671 #

CSIR-TRANS-1640 ..... N84-17420 #
CSIR-TRANS-1693 ..... N84-17418 #
CSIR-TRANS-1694 ..... N84-17416 #
CSIR-TRANS-1700 ..... N84-17419 #
CSIR-TRANS-1701 ..... N84-17724 #
CSIR-TRANS-1702 ..... N84-17417 #
CSIR-TRANS-1704 ..... N84-17349 #

CSIR-TSD-0008/82 ..... N84-17600 #

CWRU/DMS/TR-14 ..... N84-17399 #

DC-63 ..... N84-17179 #

DEW-83-2 ..... N84-17441 #

DE83-009405 ..... N84-17686 #
DE83-011325 ..... N84-18077 #
DE83-014236 ..... N84-17690 #
DE83-014392 ..... N84-17693 #
DE83-014856 ..... N84-17566 #
DE83-015695 ..... N84-17297 #
DE83-015913 ..... N84-17316 #
DE83-016756 ..... N84-18056 #
DE83-017148 ..... N84-18055 #
DE84-000016 ..... N84-17402 #
DE84-000063 ..... N84-17973 #
DE84-001022 ..... N84-17502 #
DE84-001424 ..... N84-17501 #
DE84-001707 ..... N84-18110 #
DE84-001770 ..... N84-17632 #
DE84-002008 ..... N84-17914 #
DE84-002104 ..... N84-17584 #
DE84-002115 ..... N84-17368 #
DE84-002174 ..... N84-18075 #
DE84-002181 ..... N84-17975 #
DE84-002310 ..... N84-18093 #
DE84-002463 ..... N84-18084 #
DE84-002600 ..... N84-18039 #
DE84-002609 ..... N84-17500 #
DE84-002634 ..... N84-17971 #
DE84-002779 ..... N84-17565 #
DE84-002780 ..... N84-17564 #
DE84-002829 ..... N84-17412 #
DE84-002840 ..... N84-17413 #
DE84-002856 ..... N84-18037 #
DE84-002864 ..... N84-18034 #
DE84-002887 ..... N84-18076 #
DE84-002899 ..... N84-18080 #
DE84-002911 ..... N84-18042 #
DE84-002971 ..... N84-17689 #
DE84-002997 ..... N84-18094 #
DE84-003008 ..... N84-18031 #
DE84-003161 ..... N84-17372 #
DE84-003183 ..... N84-17317 #
DE84-003203 ..... N84-17370 #
DE84-003217 ..... N84-18045 #
DE84-003242 ..... N84-18057 #
DE84-003255 ..... N84-17371 #
DE84-003265 ..... N84-18035 #
DE84-003270 ..... N84-17377 #
DE84-003302 ..... N84-17403 #
DE84-003304 ..... N84-17702 #
DE84-003316 ..... N84-17633 #
DE84-003340 ..... N84-17151 #
DE84-003357 ..... N84-18024 #
DE84-003361 ..... N84-17974 #
DE84-003382 ..... N84-17376 #
DE84-003384 ..... N84-17700 #
DE84-003390 ..... N84-17703 #
DE84-003402 ..... N84-17597 #
DE84-003404 ..... N84-17678 #
DE84-003405 ..... N84-18033 #
DE84-003411 ..... N84-17374 #
DE84-003438 ..... N84-17740 #
DE84-003442 ..... N84-18038 #
DE84-003455 ..... N84-17375 #
DE84-003460 ..... N84-18081 #
DE84-003461 ..... N84-17679 #
DE84-003477 ..... N84-17550 #
DE84-003574 ..... N84-17807 #
DE84-003585 ..... N84-17978 #
DE84-003595 ..... N84-18041 #
DE84-003601 ..... N84-18036 #
DE84-003622 ..... N84-18078 #
DE84-003632 ..... N84-17380 #
DE84-003634 ..... N84-17699 #
DE84-003638 ..... N84-17701 #
DE84-003645 ..... N84-17373 #
DE84-003649 ..... N84-18040 #
DE84-003704 ..... N84-18058 #
DE84-003709 ..... N84-18032 #
DE84-003712 ..... N84-18023 #
DE84-003713 ..... N84-17369* #

DE84-003736 ..... N84-18060 #
DE84-003736 ..... N84-18063 #
DE84-003739 ..... N84-18062 #
DE84-003740 ..... N84-17568 #
DE84-003744 ..... N84-17404 #
DE84-003751 ..... N84-17585 #
DE84-003764 ..... N84-17692 #
DE84-003767 ..... N84-18061 #
DE84-003779 ..... N84-17551 #
DE84-003786 ..... N84-18143 #
DE84-003832 ..... N84-17739 #
DE84-003838 ..... N84-17319 #
DE84-003913 ..... N84-18012 #
DE84-003914 ..... N84-17972 #
DE84-003954 ..... N84-17379 #
DE84-003961 ..... N84-18022 #
DE84-003975 ..... N84-18059 #
DE84-003978 ..... N84-17318 #
DE84-004006 ..... N84-17378 #
DE84-004018 ..... N84-17381 #
DE84-004021 ..... N84-18079 #
DE84-004050 ..... N84-17567 #
DE84-004098 ..... N84-17677 #
DE84-004444 ..... N84-17660 #
DE84-004920 ..... N84-17862 #
DE84-004927 ..... N84-17382 #
DE84-004976 ..... N84-17320 #
DE84-004986 ..... N84-17977* #
DE84-004989 ..... N84-17976 #
DE84-004994 ..... N84-17368* #
DE84-900416 ..... N84-17691 #

DFVLR-FB-83-24 ..... N84-17202 #

DFVLR-MITT-83-09 ..... N84-17169 #
DFVLR-MITT-83-10 ..... N84-17123 #
DFVLR-MITT-83-12 ..... N84-17763 #
DFVLR-MITT-83-14 ..... N84-17160 #

DM.51/CV/JP/327.83-VOL-1 ..... N84-17507 #
DM.51/CV/JP/327.83-VOL-2 ..... N84-17508 #

DOE/ER-03077/202 ..... N84-17977* #
DOE/ER-03077/203 ..... N84-17976 #
DOE/ER-10000/T3 ..... N84-17693 #
DOE/ER-10000/T4 ..... N84-17690 #
DOE/ER-10361/4 ..... N84-17740 #
DOE/ER-10419/3 ..... N84-18038 #
DOE/ER-10598/4 ..... N84-18076 #
DOE/ER-10860/T1 ..... N84-18023 #
DOE/ER-40058/1 ..... N84-18039 #
DOE/ER-52061/1 ..... N84-18055 #
DOE/ER-54010/T1 ..... N84-18056 #
DOE/ER-70058/T2 ..... N84-17320 #

DOE/EV-10468/T1 ..... N84-17680 #

DOE/NASA/0032-21 ..... N84-18117* #
DOE/NASA/20320-57-PT-2 ..... N84-17479* #

DOT-TSC-RSPA-83-10 ..... N84-17170 #

DOT/FAA-ACS-83-1(18) ..... N84-17156 #

DOT/TSC/FAA-83-1 ..... N84-17758 #

DP-MS-83-25 ..... N84-17550 #

DREV-4310/83 ..... N84-17308 #

DRSMI-RE-83-16-TR ..... N84-17452 #

DTNSRDC-83/075 ..... N84-18020 #

DTNSRDC/PAS-81/18 ..... N84-18009 #

DTNSRDC/SME-CR-18-83-VOL-1 ..... N84-17626 #
DTNSRDC/SME-CR-19-83-VOL-2 ..... N84-17627 #

D180-27265-2 ..... N84-17157 #

E-1746 ..... N84-17525* #
E-1795 ..... N84-17350* #
E-1796 ..... N84-17355* #
E-1801 ..... N84-17590* #
E-1814 ..... N84-17591* #
E-1869 ..... N84-17982* #
E-1877 ..... N84-17352* #
E-1895 ..... N84-17606* #
E-1926 ..... N84-17592* #
E-1934 ..... N84-17143* #
E-1938 ..... N84-17351* #
E-1942 ..... N84-17354* #
E-1958 ..... N84-17142* #
E-1972-PT-2 ..... N84-17479* #
E-1975 ..... N84-17533* #
E-1983 ..... N84-17138* #
E-1997 ..... N84-17353* #

ED-AX-316 ..... N84-17559* #

EPA-AA-CTAB/TA-83-6 ..... N84-17599 #

EPA-450/5-82-007 ..... N84-17711 #
EPA-520/5-83-014 ..... N84-17709 #
EPA-520/5-83-015 ..... N84-17710 #
EPA-520/5-83-016 ..... N84-17708 #
EPA-600/2-83-116 ..... N84-17187 #
EPA-600/3-83-003 ..... N84-17712 #
EPA-600/3-83-106 ..... N84-17713 #

ER-2273-8 ..... N84-17556* #

ERC-RP-200-DS-009-VOL-1 ..... N84-17423 #
ERC-RP-200-DS-009-VOL-2 ..... N84-17424 #

ESA-CR(P)-1788 ..... N84-17765 #
ESA-CR(P)-1790-VOL-1 ..... N84-17282 #
ESA-CR(P)-1790-VOL-2 ..... N84-17283 #
ESA-CR(P)-1792-VOL-1 ..... N84-17463 #
ESA-CR(P)-1792-VOL-2 ..... N84-17464 #
ESA-CR(P)-1793-VOL-1 ..... N84-17465 #
ESA-CR(P)-1793-VOL-2 ..... N84-17466 #
ESA-CR(P)-1796 ..... N84-17284 #
ESA-CR(P)-1797 ..... N84-17285 #
ESA-CR(P)-1801-VOL-1 ..... N84-17505 #
ESA-CR(P)-1801-VOL-2 ..... N84-17506 #
ESA-CR(P)-1805 ..... N84-17242 #
ESA-CR(P)-1807 ..... N84-17243 #
ESA-CR(P)-1809 ..... N84-17569 #
ESA-CR(P)-1810 ..... N84-17683 #
ESA-CR(P)-1812-VOL-1 ..... N84-17423 #
ESA-CR(P)-1812-VOL-2 ..... N84-17424 #
ESA-CR(P)-1813-VOL-1 ..... N84-17507 #
ESA-CR(P)-1813-VOL-2 ..... N84-17508 #

ESA-CR-(P)-1794 ..... N84-17241 #

ESA-SP-198 ..... N84-17253 #
ESA-SP-205 ..... N84-17650 #

ESA-TT-817 ..... N84-18013 #
ESA-TT-822 ..... N84-18014 #
ESA-TT-835 ..... N84-17123 #

ESD-TR-83-042 ..... N84-17447 #
ESD-TR-83-053 ..... N84-17454 #
ESD-TR-83-205 ..... N84-17891 #

ESG-DOE-13414 ..... N84-18045 #

ETL-0295 ..... N84-17913 #
ETL-0326 ..... N84-17672 #
ETL-0330 ..... N84-17438 #
ETL-0333 ..... N84-17676 #
ETL-0337 ..... N84-17670 #
ETL-0341 ..... N84-17675 #
ETL-0345 ..... N84-18048 #

E84-10081 ..... N84-17641* #

FAA-AM-83-14-5 ..... N84-17830 #
FAA-AM-83-18 ..... N84-17158 #

FAA-PM-83-29 ..... N84-17758 #

FAAA-83-3-11 ..... N84-17622* #
FAAA-83-9-8 ..... N84-17615* #

FCC/OST/R83-3 ..... N84-17470 #

FCC/OST/TM-83-7 ..... N84-17474 #

FDA/NCDRH-84/6 ..... N84-17587 #

FHWA-TS-83-206 ..... N84-17426 #

FIM-100 ..... N84-17915 #

FME-R-1/9693 ..... N84-17622* #
FME-R-1G/9693 ..... N84-17615* #

FOA-A-40045-A3 ..... N84-17705 #
FOA-A-56005-H2 ..... N84-17863 #

FOA-C-20500-E4 ..... N84-17864 #
FOA-C-20504-E4 ..... N84-17634 #
FOA-C-20506-E4 ..... N84-18025 #
FOA-C-20507-D1 ..... N84-17159 #
FOA-C-20508-D8 ..... N84-17916 #
FOA-C-30300-E1 ..... N84-17457 #
FOA-C-30302-A3 ..... N84-17458 #
FOA-C-30303-E2 ..... N84-17459 #
FOA-C-30316-E1 ..... N84-17917 #
FOA-C-30320-A3 ..... N84-17192 #
FOA-C-30327-E ..... N84-17503 #
FOA-C-30330-E3 ..... N84-17460 #
FOA-C-30333-E1 ..... N84-17586 #
FOA-C-30334-E1 ..... N84-17461 #
FOA-C-30335-E1 ..... N84-17979 #
FOA-C-30339-E1,E3 ..... N84-17918 #
FOA-C-30340-E2 ..... N84-17682 #
FOA-C-40165-A1(C1) ..... N84-17741 #
FOA-C-40185-C2(H2) ..... N84-17707 #
FOA-C-56033-H2 ..... N84-17847 #
FOA-C-56034-H2 ..... N84-17848 #
FOA-C-56035-H2 ..... N84-17849 #
FOA-C-56039-H2-PT-2 ..... N84-17422 #

FPR-6 ..... N84-18071 #

FQSR-6 ..... N84-17289 #

FR-1 ..... N84-18070 #
FR-3 ..... N84-17304 #

FSU-STATISTICS-M674 ..... N84-17961 #

FTD-ID(RS)T-0874-83 ..... N84-17280 #
FTD-ID(RS)T-1131-83 ..... N84-18011 #
FTD-ID(RS)T-1132-83 ..... N84-18010 #
FTD-ID(RS)T-1182-83 ..... N84-18029 #
FTD-ID(RS)T-1258-83 ..... N84-17361 #
FTD-ID(RS)T-1410-83 ..... N84-17397 #
FTD-ID(RS)T-1425-83 ..... N84-17201 #
FTD-ID(RS)T-1433-83 ..... N84-17967 #
FTD-ID(RS)T-1441-83 ..... N84-18051 #
FTD-ID(RS)T-1454-83 ..... N84-17204 #
FTD-ID(RS)T-1525-83 ..... N84-18107 #
FTD-ID(RS)T-1577-83 ..... N84-17362 #

G-81-12(19) ..... N84-17842 #
G-2532-VOL-1 ..... N84-17505 #
G-2745-VOL-2 ..... N84-17506 #

GAO/NSIAD-84-13 ..... N84-17286 #

GAO/RCED-83-218 ..... N84-18097 #

GC-TR-83-269 ..... N84-17315 #

GL-3628 ..... N84-17421 #

GMV-211/83 ..... N84-17243 #

GPO-21-095 ..... N84-18085 #
GPO-24-902 ..... N84-18115 #
GPO-26-312 ..... N84-18114 #
GPO-26-497 ..... N84-17152 #
GPO-26-498 ..... N84-17194 #
GPO-26-860 ..... N84-17164 #
GPO-27-618 ..... N84-17409 #
GPO-27-838 ..... N84-17640 #
GPO-27-914 ..... N84-17193 #
GPO-31-006 ..... N84-17238 #

GRI-81/0124 ..... N84-17810 #
GRI-81/0177 ..... N84-17331 #
GRI-81/0199 ..... N84-17608 #
GRI-82/0077 ..... N84-17405 #
GRI-82/0082 ..... N84-17333 #
GRI-82/0094 ..... N84-17332 #

H-REPT-98-509 ..... N84-17238 #
H-REPT-98-510 ..... N84-17164 #
H-REPT-98-593 ..... N84-17640 #

H-1212 ..... N84-17250* #
H-1219 ..... N84-17620* #

HAC-E6093 ..... N84-17180 #

HEDL-SA-2897 ..... N84-17379 #
HEDL-SA-2912-FP ..... N84-17368 #

HHS/PUB/FDA-83-8220 ..... N84-17587 #

HMI-B-389 ..... N84-18008 #

HOME-FIRE-PROJECT-TR-57 ..... N84-17162 #

IAF-83-220 ..... N84-17208

ICASE-84-1 ..... N84-17899* #
ICASE-84-2 ..... N84-17621* #

IIHR-LD-REPORT-113 ..... N84-17539 #

IIHR-266 ..... N84-17554 #

IITRI-E06516-6 ..... N84-17445 #

INPE-2764-PRE/338 ..... N84-17898 #
INPE-2773-TDL/136 ..... N84-17926 #
INPE-2782-PRE/348 ..... N84-18100 #

IR-AL-016 ..... N84-17167* #
IR-AL-017 ..... N84-17196* #

IS-4815 ..... N84-17971 #

ISBN-0-7988-2364 ..... N84-17600 #
ISBN-0-7988-2553-7 ..... N84-17783 #
ISBN-90-6196-248-X ..... N84-17990 #
ISBN-90-6196-249-8 ..... N84-17999 #
ISBN-90-6196-251-X ..... N84-18101 #
ISBN-90-6196-252-8 ..... N84-17989 #
ISBN-90-6196-254-4 ..... N84-17873 #
ISBN-90-6196-255-2 ..... N84-17879 #
ISBN-90-6196-256-0 ..... N84-17938 #
ISBN-90-6196-257-9 ..... N84-17937 #
ISBN-90-6196-259-5 ..... N84-17939 #
ISBN-90-6196-261-7 ..... N84-17940 #
ISBN-92-63-15008-4 ..... N84-17764 #

ISI-V-3835-04 ..... N84-17177 #

ISI/RS-83-8 ..... N84-17929 #

ISSN-0071-9196 ..... N84-17681 #
ISSN-0170-1339 ..... N84-17504 #
ISSN-0170-1339 ..... N84-17694 #
ISSN-0170-1339 ..... N84-17695 #
ISSN-0170-1339 ..... N84-18124 #
ISSN-0281-0220 ..... N84-17705 #
ISSN-0281-0239 ..... N84-17863 #
ISSN-0308-5074 ..... N84-18125 #
ISSN-0308-5074 ..... N84-18126 #
ISSN-0340-7608 ..... N84-17183 #
ISSN-0340-7608 ..... N84-17321 #
ISSN-0340-7608 ..... N84-17322 #
ISSN-0340-7608 ..... N84-17323 #
ISSN-0340-7608 ..... N84-17383 #
ISSN-0340-7608 ..... N84-17696 #
ISSN-0340-7608 ..... N84-17704 #
ISSN-0340-8922 ..... N84-17209
ISSN-0347-2124 ..... N84-17707 #
ISSN-0347-2124 ..... N84-17741 #
ISSN-0347-3694 ..... N84-17159 #
ISSN-0347-3694 ..... N84-17634 #
ISSN-0347-3694 ..... N84-17864 #
ISSN-0347-3694 ..... N84-17916 #
ISSN-0347-3694 ..... N84-18025 #
ISSN-0347-3708 ..... N84-17192 #
ISSN-0347-3708 ..... N84-17460 #
ISSN-0347-3708 ..... N84-17461 #
ISSN-0347-3708 ..... N84-17503 #
ISSN-0347-3708 ..... N84-17586 #
ISSN-0347-3708 ..... N84-17682 #
ISSN-0347-3708 ..... N84-17917 #
ISSN-0347-3708 ..... N84-17918 #
ISSN-0347-7665 ..... N84-17422 #
ISSN-0356-6951 ..... N84-17921 #
ISSN-0379-6566 ..... N84-17253 #
ISSN-0379-6566 ..... N84-17650 #
ISSN-0469-4236 ..... N84-17643 #

ITR-1 ..... N84-17360 #

JA-62 ..... N84-17239* #

JHU/APL/CPE-8305-VOL-8 ..... N84-17834 #

JHU/EECS-83/14 ..... N84-17496 #
JHU/EECS-83/18 ..... N84-17607 #

KGRD-19 ..... N84-17745 #

KORD-12 ..... N84-17802 #

K06018 ..... N84-17558* #

L-2341 ..... N84-17814 #
L-2399 ..... N84-17817 #
L-2403 ..... N84-17836 #
L-2456 ..... N84-17811 #
L-15602 ..... N84-17184* #
L-15639 ..... N84-17132* #
L-15651 ..... N84-17784* #
L-15655 ..... N84-17186* #
L-15669 ..... N84-17534* #
L-15684 ..... N84-17575* #
L-15687 ..... N84-17127* #
L-15690 ..... N84-18044* #
L-15697 ..... N84-17175* #
L-15705 ..... N84-17134* #
L-15711 ..... N84-17165* #
L-15733 ..... N84-17211* #

LA-UR-83-1070 ..... N84-18077 #
LA-UR-83-2190 ..... N84-17316 #
LA-UR-83-2980 ..... N84-18110 #
LA-UR-83-3205 ..... N84-17551 #
LA-UR-83-3217 ..... N84-18143 #
LA-UR-83-3368 ..... N84-17739 #
LA-UR-83-3391 ..... N84-17319 #

LA-9613-MS ..... N84-18058 #
LA-9763-M ..... N84-17318 #
LA-9875-MS ..... N84-18093 #
LA-9888-T ..... N84-18059 #

LBL-15051 ..... N84-18022 #
LBL-15646-REV ..... N84-17566 #
LBL-16298 ..... N84-18080 #
LBL-16639 ..... N84-18042 #
LBL-16785 ..... N84-17975 #

LC-26-27766 ..... N84-17425 #
LC-63-37059 ..... N84-17328 #
LC-63-37059 ..... N84-17406 #
LC-82-600594 ..... N84-17892 #
LC-83-600538 ..... N84-17325 #
LC-83-600571 ..... N84-17324 #

LCDS-83-12 ..... N84-17958 #
LCDS-83-14 ..... N84-17946 #
LCDS-83-22 ..... N84-17947 #
LCDS-83-23 ..... N84-17945 #

LCHC-08-01 ..... N84-17901 #

LDGO-83-2 ..... N84-17797 #

LIDS-P-1335 ..... N84-17949 #
LIDS-P-1351 ..... N84-17988* #

LMI-NA302 ..... N84-18092 #

LMSC-HREC-TR-D867307 ..... N84-17287* #

LSI-TR-406-4 ..... N84-17855* #
LSI-TR-481-4 ..... N84-17856* #
LSI-TR-482-4 ..... N84-17857* #

MATH-CENTRE-TRACTS-154-PT-1 ..... N84-17990 #
MATH-CENTRE-TRACTS-155-PT-2 ..... N84-17999 #
MATH-CENTRE-TRACTS-156 ..... N84-18101 #
MATH-CENTRE-TRACTS-157 ..... N84-17989 #
MATH-CENTRE-TRACTS-158-PT-1 ..... N84-17873 #
MATH-CENTRE-TRACTS-159-PT-2 ..... N84-17879 #
MATH-CENTRE-TRACTS-160 ..... N84-17938 #
MATH-CENTRE-TRACTS-161 ..... N84-17937 #
MATH-CENTRE-TRACTS-162 ..... N84-17939 #
MATH-CENTRE-TRACTS-164 ..... N84-17940 #

MCR-81-630 ..... N84-17248* #
MCR-83-645 ..... N84-17686* #
MCR-84-502 ..... N84-17249* #

MERADCOM-2387 ..... N84-17933 #

MGB-8027-001-FR ..... N84-17426 #

MIM-3098 ..... N84-17567 #

MITSG-83-13 ..... N84-17801 #

MLM-3110(OP) ..... N84-17412 #
MLM-3117-OP ..... N84-17413 #

MPE-39 ..... N84-17209

MRC/WDC-R-073 ..... N84-18028 #

MRDC41067.6FR ..... N84-18069 #
MRDC41083.29FTR ..... N84-17890 #

MRL-R-885 ..... N84-17301 #
MRL-R-894 ..... N84-17482 #
MRL-R-896 ..... N84-17408 #
MRL-R-902 ..... N84-17803 #
MRL-R-905 ..... N84-17524 #
MRL-R-911 ..... N84-17387 #

MRL-TN-476 ..... N84-17557 #

MSHD-RD-83-675 ..... N84-17636 #

MTI-83ASE334SA4 ..... N84-18117* #
MTP-6-2-050 ..... N84-17446 #
MTP-6-2-065-REV ..... N84-17449 #

MTR-8827 ..... N84-17448 #
MTR-8866 ..... N84-17891 #

MW-83-2 ..... N84-17443 #

NA-76-562 ..... N84-17173* #
NA-76-563 ..... N84-17174* #

NADC-81108-60 ..... N84-17395 #
NADC-83030-60 ..... N84-17906 #
NADC-83053-60 ..... N84-17294 #
NADC-83096-60 ..... N84-17147 #
NADC-83115-60 ..... N84-17823 #
NADC-83127-60 ..... N84-17356 #

NAS 1.15:77026 ..... N84-17302* #
NAS 1.15:77088 ..... N84-18016* #
NAS 1.15:77090 ..... N84-17804* #
NAS 1.15:82549 ..... N84-17239* #
NAS 1.15:82564 ..... N84-18141* #
NAS 1.15:82566 ..... N84-17756* #
NAS 1.15:83479 ..... N84-17355* #
NAS 1.15:83555 ..... N84-17143* #
NAS 1.15:83559 ..... N84-17982* #
NAS 1.15:83563 ..... N84-17354* #
NAS 1.15:83566 ..... N84-17351* #
NAS 1.15:83570 ..... N84-17591* #
NAS 1.15:83572 ..... N84-17352* #
NAS 1.15:83575 ..... N84-17142* #
NAS 1.15:83578 ..... N84-17592* #
NAS 1.15:83581 ..... N84-17479* #
NAS 1.15:83586 ..... N84-17533* #
NAS 1.15:83588 ..... N84-17138* #
NAS 1.15:83595 ..... N84-17353* #
NAS 1.15:84853 ..... N84-18018* #
NAS 1.15:85120 ..... N84-18149* #
NAS 1.15:85439 ..... N84-17947 #
NAS 1.15:85521 ..... N84-18102* #
NAS 1.15:85522 ..... N84-17168* #
NAS 1.15:85646 ..... N84-17784* #
NAS 1.15:85690 ..... N84-17186* #
NAS 1.15:85693 ..... N84-18044* #
NAS 1.15:85713 ..... N84-17134* #
NAS 1.15:85737 ..... N84-17185* #
NAS 1.15:85740 ..... N84-17135* #
NAS 1.15:85752 ..... N84-17900* #
NAS 1.15:85754 ..... N84-17560* #
NAS 1.15:85855 ..... N84-17144* #
NAS 1.15:85865 ..... N84-18152* #
NAS 1.15:85880 ..... N84-17141* #
NAS 1.15:85881 ..... N84-17137* #
NAS 1.15:86024 ..... N84-17250* #
NAS 1.15:86045 ..... N84-18123* #
NAS 1.15:86047 ..... N84-18150* #
NAS 1.15:86049 ..... N84-18132* #
NAS 1.15:86051 ..... N84-18131* #
NAS 1.15:86055 ..... N84-18151* #
NAS 1.15:172276 ..... N84-18047* #
NAS 1.20:140 ..... N84-17210* #
NAS 1.21:7037(169) N84-17117*
NAS 1.26:3676 ..... N84-17130* #
NAS 1.26:3698 ..... N84-17248* #
NAS 1.26:3726 ..... N84-17149* #
NAS 1.26:3754 ..... N84-17129* #
NAS 1.26:3764 ..... N84-17131* #
NAS 1.26:3770 ..... N84-17606* #
NAS 1.26:3776 ..... N84-17178* #
NAS 1.26:3777 ..... N84-17189* #
NAS 1.26:166463 ..... N84-18136* #
NAS 1.26:166464 ..... N84-18137* #
NAS 1.26:166474 ..... N84-17838* #
NAS 1.26:166531 ..... N84-17936* #
NAS 1.26:166538 ..... N84-17857* #
NAS 1.26:166539 ..... N84-17856* #
NAS 1.26:166540 ..... N84-17855* #
NAS 1.26:166541 ..... N84-17528* #
NAS 1.26:166542 ..... N84-17526* #
NAS 1.26:166544 ..... N84-18015* #
NAS 1.26:166545 ..... N84-17527* #
NAS 1.26:166546 ..... N84-17519* #
NAS 1.26:166547 ..... N84-17133* #
NAS 1.26:166548 ..... N84-17433* #
NAS 1.26:168205 ..... N84-18117* #
NAS 1.26:168240 ..... N84-17477* #
NAS 1.26:168252 ..... N84-17530* #
NAS 1.26:168273 ..... N84-17481* #
NAS 1.26:168331 ..... N84-17410* #
NAS 1.26:168332 ..... N84-17139* #
NAS 1.26:168334 ..... N84-17407* #
NAS 1.26:170409 ..... N84-17173* #
NAS 1.26:170410 ..... N84-17174* #
NAS 1.26:170413 ..... N84-17620* #
NAS 1.26:170903 ..... N84-17622* #

NAS 1.26:170904 ..... N84-17615* #
NAS 1.26:170960 ..... N84-17287* #
NAS 1.26:170962 ..... N84-17522* #
NAS 1.26:170968 ..... N84-17167* #
NAS 1.26:170969 ..... N84-17249* #
NAS 1.26:170972 ..... N84-17251* #
NAS 1.26:170973 ..... N84-17166* #
NAS 1.26:170974 ..... N84-17686* #
NAS 1.26:170976 ..... N84-17574* #
NAS 1.26:170980 ..... N84-17196* #
NAS 1.26:171728 ..... N84-17431* #
NAS 1.26:171730 ..... N84-17523* #
NAS 1.26:171733 ..... N84-17531* #
NAS 1.26:171735 ..... N84-17556* #
NAS 1.26:171736 ..... N84-17434* #
NAS 1.26:171738 ..... N84-17435* #
NAS 1.26:171739 ..... N84-17559* #
NAS 1.26:171740 ..... N84-17244* #
NAS 1.26:171741 ..... N84-17245* #
NAS 1.26:171742 ..... N84-17246* #
NAS 1.26:171745 ..... N84-17820* #
NAS 1.26:171746 ..... N84-17821* #
NAS 1.26:172227 ..... N84-17558* #
NAS 1.26:172289 ..... N84-17899* #
NAS 1.26:172291 ..... N84-17136* #
NAS 1.26:172292 ..... N84-18017* #
NAS 1.26:172293 ..... N84-17621* #
NAS 1.26:172294 ..... N84-17119* #
NAS 1.26:172295 ..... N84-17118* #
NAS 1.26:172789 ..... N84-18067* #
NAS 1.26:172790 ..... N84-18142* #
NAS 1.26:172791 ..... N84-17252* #
NAS 1.26:173154 ..... N84-17369* #
NAS 1.26:173155 ..... N84-17437* #
NAS 1.26:173159 ..... N84-17388* #
NAS 1.26:173161 ..... N84-17977* #
NAS 1.26:173162 ..... N84-17384* #
NAS 1.26:173217 ..... N84-17988* #
NAS 1.26:173231 ..... N84-17641* #
NAS 1.26:173259 ..... N84-17293* #
NAS 1.26:173277 ..... N84-18147* #
NAS 1.26:173278 ..... N84-18138* #
NAS 1.26:173279 ..... N84-17389* #
NAS 1.26:173281 ..... N84-17697* #
NAS 1.26:173282 ..... N84-17532* #
NAS 1.26:173283 ..... N84-17576* #
NAS 1.26:173284 ..... N84-17436* #
NAS 1.26:173285 ..... N84-17723* #
NAS 1.26:173289 ..... N84-17729* #
NAS 1.26:173290 ..... N84-17617* #
NAS 1.26:173291 ..... N84-17618* #
NAS 1.26:173292 ..... N84-17619* #
NAS 1.26:173293 ..... N84-17292* #
NAS 1.26:173294 ..... N84-17140* #
NAS 1.26:173295 ..... N84-17195* #
NAS 1.26:173296 ..... N84-17858* #
NAS 1.26:173297 ..... N84-17859* #
NAS 1.26:173299 ..... N84-17852* #
NAS 1.26:173300 ..... N84-18086* #
NAS 1.26:173303 ..... N84-17730* #
NAS 1.26:173304 ..... N84-17642* #
NAS 1.26:173309 ..... N84-17521* #
NAS 1.26:173310 ..... N84-17722* #
NAS 1.26:175150 ..... N84-17725* #
NAS 1.26:175153 ..... N84-17432* #
NAS 1.26:175159 ..... N84-17480* #
NAS 1.26:175160-VOL-2 ..... N84-17203* #
NAS 1.26:175165 ..... N84-17726* #
NAS 1.26:175180 ..... N84-17727* #
NAS 1.26:175185 ..... N84-18066* #
NAS 1.26:175208 ..... N84-17718* #
NAS 1.26:175361 ..... N84-18119* #
NAS 1.26:175362 ..... N84-17755* #
NAS 1.26:175364 ..... N84-17529* #
NAS 1.26:175365 ..... N84-17520* #
NAS 1.26:175366 ..... N84-17616* #
NAS 1.26:175368 ..... N84-18148* #
NAS 1.26:175369 ..... N84-17172* #
NAS 1.26:175370 ..... N84-17721 #
NAS 1.26:175371 ..... N84-18046* #
NAS 1.26:175372 ..... N84-18120* #
NAS 1.26:175373 ..... N84-17728* #
NAS 1.26:175374 ..... N84-18130* #
NAS 1.26:175375 ..... N84-17941* #
NAS 1.26:175376 ..... N84-18122* #
NAS 1.26:175377 ..... N84-18121* #
NAS 1.26:175378 ..... N84-18026* #
NAS 1.26:175379 ..... N84-17478* #
NAS 1.26:175380 ..... N84-17171* #
NAS 1.55:2284 ..... N84-17211* #
NAS 1.60:2220 ..... N84-17590* #
NAS 1.60:2229 ..... N84-17534* #
NAS 1.60:2230 ..... N84-17184* #
NAS 1.60:2241 ..... N84-17575* #
NAS 1.60:2262 ..... N84-17175* #
NAS 1.60:2265 ..... N84-17127* #
NAS 1.60:2268 ..... N84-17525* #
NAS 1.60:2270 ..... N84-17132* #
NAS 1.60:2280 ..... N84-17350* #
NAS 1.60:2281 ..... N84-17165* #

NASA-CASE-NPO-15426-1 ..... N84-17555*

NASA-CP-2294 ..... N84-17211* #

NASA-CR-3676 ..... N84-17130* #
NASA-CR-3696 ..... N84-17248* #
NASA-CR-3726 ..... N84-17149* #
NASA-CR-3754 ..... N84-17129* #
NASA-CR-3764 ..... N84-17131* #
NASA-CR-3770 ..... N84-17606* #
NASA-CR-3776 ..... N84-17178* #
NASA-CR-3777 ..... N84-17189* #
NASA-CR-10410 ..... N84-17174* #
NASA-CR-166463 ..... N84-18136* #
NASA-CR-166464 ..... N84-18137* #
NASA-CR-166474 ..... N84-17838* #
NASA-CR-166531 ..... N84-17936* #
NASA-CR-166538 ..... N84-17857* #
NASA-CR-166539 ..... N84-17856* #
NASA-CR-166540 ..... N84-17855* #
NASA-CR-166541 ..... N84-17528* #
NASA-CR-166542 ..... N84-17526* #
NASA-CR-166544 ..... N84-18015* #
NASA-CR-166545 ..... N84-17527* #
NASA-CR-166546 ..... N84-17519* #
NASA-CR-166547 ..... N84-17133* #
NASA-CR-166548 ..... N84-17433* #
NASA-CR-168205 ..... N84-18117* #
NASA-CR-168240 ..... N84-17477* #
NASA-CR-168252 ..... N84-17530* #
NASA-CR-168273 ..... N84-17481* #
NASA-CR-168331 ..... N84-17410* #
NASA-CR-168332 ..... N84-17139* #
NASA-CR-168334 ..... N84-17407* #
NASA-CR-170409 ..... N84-17173* #
NASA-CR-170413 ..... N84-17620* #
NASA-CR-170903 ..... N84-17622* #
NASA-CR-170904 ..... N84-17615* #
NASA-CR-170960 ..... N84-17287* #
NASA-CR-170962 ..... N84-17522* #
NASA-CR-170968 ..... N84-17167* #
NASA-CR-170969 ..... N84-17249* #
NASA-CR-170972 ..... N84-17251* #
NASA-CR-170973 ..... N84-17166* #
NASA-CR-170974 ..... N84-17686* #
NASA-CR-170976 ..... N84-17574* #
NASA-CR-170980 ..... N84-17196* #
NASA-CR-171728 ..... N84-17431* #
NASA-CR-171730 ..... N84-17523* #
NASA-CR-171733 ..... N84-17531* #
NASA-CR-171735 ..... N84-17556* #
NASA-CR-171736 ..... N84-17434* #
NASA-CR-171738 ..... N84-17435* #
NASA-CR-171739 ..... N84-17559* #
NASA-CR-171740 ..... N84-17244* #
NASA-CR-171741 ..... N84-17245* #
NASA-CR-171742 ..... N84-17246* #
NASA-CR-171745 ..... N84-17820* #
NASA-CR-171746 ..... N84-17821* #
NASA-CR-172227 ..... N84-17558* #
NASA-CR-172289 ..... N84-17899* #
NASA-CR-172291 ..... N84-17136* #
NASA-CR-172292 ..... N84-18017* #
NASA-CR-172293 ..... N84-17621* #
NASA-CR-172294 ..... N84-17119* #
NASA-CR-172295 ..... N84-17118* #
NASA-CR-172789 ..... N84-18067* #
NASA-CR-172790 ..... N84-18142* #
NASA-CR-172791 ..... N84-17252* #
NASA-CR-173154 ..... N84-17369* #
NASA-CR-173155 ..... N84-17437* #
NASA-CR-173159 ..... N84-17388* #
NASA-CR-173161 ..... N84-17977* #
NASA-CR-173162 ..... N84-17384* #
NASA-CR-173217 ..... N84-17988* #
NASA-CR-173231 ..... N84-17641* #
NASA-CR-173259 ..... N84-17293* #
NASA-CR-173277 ..... N84-18147* #
NASA-CR-173278 ..... N84-18138* #
NASA-CR-173279 ..... N84-17389* #
NASA-CR-173281 ..... N84-17697* #
NASA-CR-173282 ..... N84-17532* #
NASA-CR-173283 ..... N84-17576* #
NASA-CR-173284 ..... N84-17436* #
NASA-CR-173285 ..... N84-17723* #
NASA-CR-173289 ..... N84-17729* #
NASA-CR-173290 ..... N84-17617* #
NASA-CR-173291 ..... N84-17618* #
NASA-CR-173292 ..... N84-17619* #
NASA-CR-173293 ..... N84-17292* #
NASA-CR-173294 ..... N84-17140* #
NASA-CR-173295 ..... N84-17195* #
NASA-CR-173296 ..... N84-17858* #
NASA-CR-173297 ..... N84-17859* #
NASA-CR-173299 ..... N84-17852* #
NASA-CR-173300 ..... N84-18086* #
NASA-CR-173303 ..... N84-17730* #
NASA-CR-173304 ..... N84-17642* #
NASA-CR-173309 ..... N84-17521* #
NASA-CR-173310 ..... N84-17722* #
NASA-CR-175150 ..... N84-17725* #
NASA-CR-175153 ..... N84-17432* #
NASA-CR-175159 ..... N84-17480* #
NASA-CR-175160-VOL-2 ..... N84-17203* #
NASA-CR-175165 ..... N84-17726* #
NASA-CR-175180 ..... N84-17727* #
NASA-CR-175185 ..... N84-18066* #
NASA-CR-175208 ..... N84-17718* #
NASA-CR-175361 ..... N84-18119* #
NASA-CR-175362 ..... N84-17755* #
NASA-CR-175364 ..... N84-17529* #
NASA-CR-175365 ..... N84-17520* #
NASA-CR-175366 ..... N84-17616* #
NASA-CR-175368 ..... N84-18148* #
NASA-CR-175369 ..... N84-17172* #
NASA-CR-175370 ..... N84-17721 #
NASA-CR-175371 ..... N84-18046* #
NASA-CR-175372 ..... N84-18120* #
NASA-CR-175373 ..... N84-17728* #
NASA-CR-175374 ..... N84-18130* #
NASA-CR-175375 ..... N84-17941* #
NASA-CR-175376 ..... N84-18122* #
NASA-CR-175377 ..... N84-18121* #
NASA-CR-175378 ..... N84-18026* #
NASA-CR-175379 ..... N84-17478* #
NASA-CR-175380 ..... N84-17171* #

NASA-NF-140 ..... N84-17210* #

NASA-SP-7037(169) N84-17117*

NASA-TM-77026 ..... N84-17302* #
NASA-TM-77088 ..... N84-18016* #
NASA-TM-77090 ..... N84-17804* #
NASA-TM-82549 ..... N84-17239* #
NASA-TM-82564 ..... N84-18141* #
NASA-TM-82566 ..... N84-17756* #
NASA-TM-83479 ..... N84-17355* #
NASA-TM-83555 ..... N84-17143* #
NASA-TM-83559 ..... N84-17982* #
NASA-TM-83563 ..... N84-17354* #
NASA-TM-83566 ..... N84-17351* #
NASA-TM-83570 ..... N84-17591* #
NASA-TM-83572 ..... N84-17352* #
NASA-TM-83575 ..... N84-17142* #
NASA-TM-83578 ..... N84-17592* #
NASA-TM-83581 ..... N84-17479* #
NASA-TM-83586 ..... N84-17533* #
NASA-TM-83588 ..... N84-17138* #
NASA-TM-83595 ..... N84-17353* #
NASA-TM-84653 ..... N84-18018* #
NASA-TM-85120 ..... N84-18149* #
NASA-TM-85439 ..... N84-17947 #
NASA-TM-85521 ..... N84-18102* #
NASA-TM-85522 ..... N84-17168* #
NASA-TM-85646 ..... N84-17784* #
NASA-TM-85690 ..... N84-17186* #
NASA-TM-85693 ..... N84-18044* #
NASA-TM-85713 ..... N84-17134* #
NASA-TM-85737 ..... N84-17185* #
NASA-TM-85740 ..... N84-17135* #
NASA-TM-85752 ..... N84-17900* #
NASA-TM-85754 ..... N84-17560* #
NASA-TM-85855 ..... N84-17144* #
NASA-TM-85865 ..... N84-18152* #
NASA-TM-85880 ..... N84-17141* #
NASA-TM-85881 ..... N84-17137* #
NASA-TM-86024 ..... N84-17250* #
NASA-TM-86045 ..... N84-18123* #
NASA-TM-86047 ..... N84-18150* #
NASA-TM-86049 ..... N84-18132* #
NASA-TM-86051 ..... N84-18131* #
NASA-TM-86055 ..... N84-18151* #
NASA-TM-172276 ..... N84-18047* #

NASA-TP-2220 ..... N84-17590* #
NASA-TP-2229 ..... N84-17534* #
NASA-TP-2230 ..... N84-17184* #
NASA-TP-2241 ..... N84-17575* #
NASA-TP-2262 ..... N84-17175* #
NASA-TP-2265 ..... N84-17127* #
NASA-TP-2268 ..... N84-17525* #
NASA-TP-2270 ..... N84-17132* #
NASA-TP-2280 ..... N84-17350* #
NASA-TP-2281 ..... N84-17165* #

NATICK/TR-83/041 ..... N84-17698 #

NATL-SEC-AFFAIRS-MONO-83-6 N84-17197 #

NAVHLTHRSCHC-83-13 N84-17825 #

NAVWESA-1-83-VOL-1 N84-17154 #
NAVWESA-1-83-VOL-2 N84-17155 #

NBDL-83R009 N84-17562 #

NBS-GCR-83-431 N84-17162 #

NBS-SP-655 N84-17325 #
NBS-SP-663 N84-17425 #

NBS-TN-1182 N84-17570 #

NBS/GCR-83/43 N84-17326 #
NBS/GCR-83/436 N84-17327 #

NBS/HB-44-1984 N84-17572 #

NBS/SP-260-85 N84-17324 #
NBS/SP-500-104 N84-17892 #

NBSIR-83-1694 N84-17329 #
NBSIR-83-2704 N84-17922 #
NBSIR-83-2754 N84-17427 #
NBSIR-83-2755 N84-17509 #
NBSIR-83-2772 N84-17384* #
NBSIR-83-2776 N84-17638 #
NBSIR-83-2790 N84-17363 #
NBSIR-1693-VOL-1 N84-17510 #

NCAR/CT-75 N84-17779 #
NCAR/CT-76 N84-17778 #

NDU/ICAF-83/047 N84-17121 #

NEAR-TR-307 N84-17129* #
NEAR-TR-310 N84-17535 #

NEPRF-TR-83-02 N84-17240 #

NIMH-83-333 N84-17850 #
NIMH-83-335 N84-17809 #

NOAA-DL-ERL-GFDL-2 N84-17780 #

NOAA-DR-ERL-ARL-3 N84-17742 #

NOAA-NWS-CRCP-10 N84-17925 #
NOAA-NWS-CRCP-11 N84-17776 #

NOAA-NWS-ERCP-12 N84-17775 #

NOAA-NWS-HR-54 N84-17777 #

NOAA-TM-ERL-ARL-122 N84-17774 #

NOAA-TR-ERL-424-ARL-7 N84-17743 #

NOAA-8392908 N84-17801 #
NOAA-83092901 N84-17748 #
NOAA-83092904 N84-17745 #
NOAA-83092905 N84-17744 #
NOAA-83092907 N84-17780 #
NOAA-83092910 N84-17800 #
NOAA-83092920 N84-18144 #
NOAA-83092921 N84-18145 #
NOAA-83100602 N84-17742 #
NOAA-83101901 N84-17771 #
NOAA-83101903 N84-17781 #
NOAA-83102001 N84-17743 #
NOAA-83102503 N84-17773 #
NOAA-83102701 N84-17772 #
NOAA-83110801 N84-17774 #
NOAA-83111404 N84-17925 #
NOAA-83111405 N84-17776 #
NOAA-83112101 N84-17802 #
NOAA-83113001 N84-17775 #
NOAA-83120107 N84-17750 #

NOAA/TR/NESDIS-3 N84-17748 #
NOAA/TR/NESDIS-5 N84-17772 #

NOAA/TR/NWS-35 N84-17766 #

NOSC/TR-813 N84-17450 #
NOSC/TR-879 N84-17970 #

NPS55-83-025 N84-17912 #
NPS62-83-058 N84-18021 #
NPS63-83-004 N84-17795 #

NRL-MR-5110 N84-17583 #
NRL-MR-5153 N84-17794 #
NRL-MR-5185 N84-17886 #
NRL-MR-5196 N84-18030 #
NRL-MR-5206 N84-17968 #
NRL-MR-5209 N84-17734 #
NRL-MR-5227 N84-17964 #

NRL-8710 N84-17493 #
NRL-8744 N84-17453 #
NRL-8755 N84-17563 #
NRL-8761 N84-17313 #

NSF/CEE-83214 N84-17747 #

NSF/CPE-83009 N84-17330 #

NSF/ISP-83016 N84-18112 #

NSF/PRA-82049 N84-18095 #
NSF/PRA-82062 N84-18096 #

NSWC/TR-82-552 N84-17498 #

NTIA-83-130 N84-17467 #

NTIA/REPORT-83/127 N84-17468 #
NTIA/REPORT-83/128 N84-17473 #
NTIA/REPORT-83/129 N84-17475 #
NTIA/REPORT-83/132 N84-17471 #
NTIA/REPORT-83/134 N84-17469 #

NU-SML-TR-83-1 N84-17630 #

NUSC-TR-6198 N84-17966 #

OEHL-83-128EH111DGA N84-17827 #

ONR-TR-83-23 N84-18019 #

ORC-83-13 N84-17967 #
ORC-83-14 N84-17910 #

ORNL/CSD-126 N84-18094 #

ORNL/TM-8866 N84-17677 #

OSD/FSTC-83/195 N84-17920 #
OSD/FSTC-83/196 N84-17919 #
OSD/FSTC-83/240 N84-17923 #
OSD/FSTC-83/241 N84-17924 #

OSU/DGSS-350 N84-18048 #

OWRT-A-054-SC(1) N84-17767 #
OWRT-A-108-ARIZ(1) N84-17684 #

PB83-195255 N84-18111 #
PB84-100122 N84-17808 #
PB84-100155 N84-17326 #
PB84-100171 N84-17850 #
PB84-100270 N84-17780 #
PB84-100445 N84-17331 #
PB84-100486 N84-18144 #
PB84-100494 N84-18145 #
PB84-100650 N84-18112 #
PB84-100734 N84-18095 #
PB84-100742 N84-18096 #
PB84-100874 N84-17800 #
PB84-100882 N84-17385 #
PB84-100908 N84-17801 #
PB84-100916 N84-17748 #
PB84-100932 N84-17333 #
PB84-100940 N84-17332 #
PB84-101021 N84-17637 #
PB84-101153 N84-17162 #
PB84-101161 N84-17744 #
PB84-101336 N84-17327 #
PB84-101435 N84-17405 #
PB84-101443 N84-17745 #
PB84-101591 N84-17472 #
PB84-101948 N84-17510 #
PB84-102144 N84-17922 #
PB84-102540 N84-17835 #
PB84-102615 N84-17427 #
PB84-102706 N84-17923 #
PB84-102714 N84-17924 #
PB84-102920 N84-17711 #
PB84-102946 N84-17865 #
PB84-102953 N84-17866 #
PB84-102961 N84-17867 #
PB84-102979 N84-17868 #
PB84-102987 N84-17869 #
PB84-103076 N84-18097 #
PB84-103084 N84-17749 #
PB84-103266 N84-17809 #
PB84-103829 N84-17599 #
PB84-104066 N84-17779 #
PB84-104074 N84-17778 #
PB84-104223 N84-17473 #
PB84-104272 N84-17475 #
PB84-104322 N84-17766 #
PB84-104363 N84-17742 #
PB84-104371 N84-17777 #
PB84-104454 N84-17639 #
PB84-104504 N84-18113 #
PB84-104785 N84-17708 #
PB84-104793 N84-17710 #
PB84-104801 N84-17709 #
PB84-104892 N84-17810 #
PB84-104942 N84-17606 #
PB84-105089 N84-17636 #
PB84-105303 N84-17554 #
PB84-105566 N84-17767 #
PB84-105816 N84-17768 #
PB84-105832 N84-17769 #
PB84-106756 N84-17770 #
PB84-107911 N84-17782 #
PB84-108166 N84-17743 #
PB84-108349 N84-17781 #
PB84-108356 N84-17771 #
PB84-109057 N84-17635 #
PB84-109669 N84-17587 #
PB84-109867 N84-17570 #
PB84-109883 N84-17325 #
PB84-109891 N84-17509 #
PB84-109909 N84-17426 #
PB84-110493 N84-17384* #
PB84-110608 N84-17684 #
PB84-110998 N84-17425 #
PB84-111210 N84-17468 #
PB84-111244 N84-17773 #
PB84-111400 N84-17467 #
PB84-112267 N84-17921 #
PB84-112648 N84-17324 #
PB84-112895 N84-17834 #
PB84-113893 N84-17920 #
PB84-113901 N84-17919 #
PB84-114099 N84-17772 #
PB84-114529 N84-17892 #
PB84-115120 N84-17471 #
PB84-115799 N84-17328 #
PB84-115849 N84-17571 #
PB84-116383 N84-17474 #
PB84-118934 N84-17469 #
PB84-119445 N84-17746 #
PB84-119700 N84-17638 #
PB84-119880 N84-17774 #
PB84-121599 N84-17170 #
PB84-122167 N84-17714 #
PB84-122472 N84-17286 #
PB84-122621 N84-17925 #
PB84-122639 N84-17776 #
PB84-122662 N84-17802 #
PB84-122704 N84-17329 #
PB84-122910 N84-17713 #
PB84-123116 N84-17470 #
PB84-124064 N84-17187 #
PB84-125229 N84-17330 #
PB84-125293 N84-17406 #
PB84-125541 N84-17598 #
PB84-125764 N84-17572 #
PB84-126952 N84-17685 #
PB84-126960 N84-17750 #
PB84-127323 N84-17124 #
PB84-127521 N84-17775 #
PB84-127919 N84-17747 #
PB84-128313 N84-17712 #

PC-01036 N84-17442 #

PERIODIC-REPT-3 N84-17799 #

POLY-EE-83-003 N84-18054 #

PPSP/PPRP-75 N84-17808 #

PR-76I N84-18127
PR-83-1 N84-17721 #
PR-125 N84-17495 #
PR-783 N84-17715
PR-813 N84-17511
PR-829 N84-18135
PR-830 N84-18134
PR-839 N84-17206

PTI-SB-2363-21-3505-VOL-1 N84-17465 #
PTI-SB-2363-21-3794-VOL-2 N84-17466 #

PTR-84-1 N84-17576* #

PUBL-604-REV. N84-17960 #

RADC-TR-83-79 N84-17909 #

RADC-TR-83-89 ..... N84-17448 #
RADC-TR-83-213 ..... N84-17451 #
RADC-TR-83-230 ..... N84-17492 #

REC-ERC-81-5 ..... N84-17637 #

REPT-2-53200/3R-53490 ..... N84-17523* #
REPT-4-83 ..... N84-17942 #
REPT-6 ..... N84-17806 #
REPT-14 ..... N84-17842 #
REPT-901-0081 ..... N84-17676 #
REPT-0303-53-1269 ..... N84-17367 #
REPT-2846-01-TR-3062 ..... N84-18103 #

RR-41 ..... N84-17121 #
RR-145 ..... N84-17746 #

RSL-TM-587-1 ..... N84-17642* #

RTI/2095/00-01-F ..... N84-17178* #

R83-915540-26 ..... N84-17530* #

S/DT/YA-25-030-VOL-1 ..... N84-17282 #
S/DT/YA-25-030-VOL-2 ..... N84-17283 #

SAI-58-EF81-156R2 ..... N84-17835 #
SAI-83/1239 ..... N84-17757 #
SAI-087-84R-001 ..... N84-17545 #

SAND-82-1016 ..... N84-17633 #
SAND-83-0429C ..... N84-17500 #
SAND-83-0432 ..... N84-17151 #
SAND-83-0882C ..... N84-17973 #
SAND-83-1141C ..... N84-17584 #
SAND-83-1422C ..... N84-18075 #
SAND-83-1423C ..... N84-17371 #
SAND-83-1621C ..... N84-18061 #
SAND-83-1647C ..... N84-17388* #
SAND-83-2417C ..... N84-17692 #
SAND-83-7020 ..... N84-17689 #

SAPR-6 ..... N84-18121* #
SAPR-45 ..... N84-17293* #

SASR-4 ..... N84-17171* #

SATGL-TR-83-0218 ..... N84-17442 #

SBCONR4 ..... N84-17582 #

SC5334.2SR ..... N84-18050 #

SD-TR-83-51-PT-1 ..... N84-17411 #
SD-TR-83-59 ..... N84-17580 #
SD-TR-83-65 ..... N84-17359 #

SE-34 ..... N84-17744 #

SEP-TS/S/194/JM/30301/81(1) ..... N84-17242 #

SER-B-263-MITT-166 ..... N84-17681 #

SERI/TP-214-1937 ..... N84-17688 #
SERI/TP-255-2091 ..... N84-17402 #

SGD-467-PT-1 ..... N84-18144 #
SGD-467-PT-2 ..... N84-18145 #

SNIAS-221-CA/LP ..... N84-17569 #

SR-1 ..... N84-17442 #
SR-1 ..... N84-17731 #
SR-7 ..... N84-17732 #

SRC-CR-83-33 ..... N84-18074 #

SU-GL-3566 ..... N84-18068 #

SU-STAN-CS-83-972 ..... N84-17888 #
SU-STAN-CS-83-976 ..... N84-17887 #
SU-STAN-CS-83-979 ..... N84-17902 #

SU-TF-19 ..... N84-17528* #

SYRU/DECE/TR-83/14 ..... N84-18007 #

T-129 ..... N84-17179 #

TCU/DC/TR-83-04 ..... N84-17392 #

TEES-TR-4587-82-01 ..... N84-17244* #
TEES-TR-4587-82-01-VOL-2 ..... N84-17245* #
TEES-TR-4587-82-01-VOL-3 ..... N84-17246* #

TENRAC/EDF-117 ..... N84-17691 #

TI-CRL-08-83-40 ..... N84-17483 #

TIR-2114-MED-2005 ..... N84-17821* #
TIR-2114-MED-2012 ..... N84-17820* #

TM-EKR3 ..... N84-17284 #

TM-89 ..... N84-17168* #

TOP-1-1-003 ..... N84-17829 #
TOP-6-2-050 ..... N84-17446 #
TOP-6-2-065 ..... N84-17449 #

TPR-4 ..... N84-17740 #

TR-J8301 ..... N84-18052 #

TR-ONR-13 ..... N84-17846 #
TR-ONR-33 ..... N84-17944 #

TR-2 ..... N84-17497 #
TR-08 ..... N84-17305 #
TR-10 ..... N84-17314 #
TR-14 ..... N84-17365 #
TR-14-ONR ..... N84-17844 #
TR-15 ..... N84-17366 #
TR-15-ONR ..... N84-17843 #
TR-21 ..... N84-18007 #
TR-31-ONR ..... N84-17983 #
TR-32 ..... N84-17396 #
TR-32-ONR ..... N84-17440 #
TR-41 ..... N84-17959 #
TR-83-21/ATD ..... N84-17295 #
TR-83-41 ..... N84-17962 #
TR-83-44 ..... N84-17957 #
TR-83-46 ..... N84-17985 #
TR-87 ..... N84-17981 #
TR-125 ..... N84-17908 #
TR-165 ..... N84-17489 #
TR-296 ..... N84-17131* #
TR-545-5 ..... N84-17673 #
TR-596 ..... N84-17454 #
TR-646 ..... N84-17447 #
TR-0083(3603)-3 ..... N84-17580 #
TR-0083(3726-02)-1 ..... N84-17359 #
TR-0083(3908)-PT-1 ..... N84-17411 #
TR-1183-8314 ..... N84-17431* #
TR-1327 ..... N84-17670 #
TR-83412 ..... N84-17176 #

TR83-25 ..... N84-17166* #

TUM-SFB-81 ..... N84-17552 #

U-OF-IOWA-83-4 ..... N84-18136* #

UCB/SESM-82/08 ..... N84-17639 #

UCID-19853 ..... N84-18012 #
UCID-19937 ..... N84-17974 #
UCID-19940 ..... N84-17972 #

UCLA-ENG-83-47 ..... N84-17928 #
UCLA-ENG-8349 ..... N84-17527* #

UCRL-88672 ..... N84-17501 #
UCRL-88913 ..... N84-17565 #
UCRL-89215 ..... N84-17585 #
UCRL-89235 ..... N84-18062 #
UCRL-89236 ..... N84-17566 #
UCRL-89296 ..... N84-18084 #
UCRL-89333 ..... N84-17404 #
UCRL-89439 ..... N84-18063 #
UCRL-89448 ..... N84-18060 #
UCRL-89471 ..... N84-18057 #
UCRL-89570 ..... N84-17564 #
UCRL-89586 ..... N84-18031 #
UCRL-89913 ..... N84-17914 #

UDR-TR-83-04 ..... N84-17543 #
UDR-TR-83-22 ..... N84-17542 #
UDR-TR-83-38 ..... N84-17303 #
UDR-TR-83-52 ..... N84-17544 #

UICDCS-R-83-1121 ..... N84-17978 #

UIEM-83-14 ..... N84-17444 #

UILU-ENG-83-1712 ..... N84-17978 #
UILU-ENG-83-2558 ..... N84-17444 #
UILU-ENG-84-0501 ..... N84-17140* #

ULRF-426/CAR ..... N84-17732 #

UMTRI-83-8 ..... N84-17598 #

UNI-SA-116 ..... N84-17632 #

UPITT/LRDC/ONR/KBC-8 ..... N84-17840 #

UR/DC-83-TR-1 ..... N84-17360 #

UROCHESTER/DC/83-TR-43 ..... N84-17581 #

US-PATENT-APPL-SN-196877 ..... N84-17555*

US-PATENT-CLASS-55-DIG.25 ..... N84-17555*
US-PATENT-CLASS-55-DIG.30 ..... N84-17555*
US-PATENT-CLASS-55-2 ..... N84-17555*
US-PATENT-CLASS-55-6 ..... N84-17555*
US-PATENT-CLASS-55-12 ..... N84-17555*
US-PATENT-CLASS-55-96 ..... N84-17555*
US-PATENT-CLASS-55-105 ..... N84-17555*
US-PATENT-CLASS-55-126 ..... N84-17555*
US-PATENT-CLASS-55-131 ..... N84-17555*
US-PATENT-CLASS-55-138 ..... N84-17555*
US-PATENT-CLASS-55-139 ..... N84-17555*
US-PATENT-CLASS-55-145 ..... N84-17555*
US-PATENT-CLASS-55-270 ..... N84-17555*
US-PATENT-CLASS-55-283 ..... N84-17555*
US-PATENT-CLASS-55-291 ..... N84-17555*
US-PATENT-CLASS-55-466 ..... N84-17555*
US-PATENT-CLASS-60-275 ..... N84-17555*
US-PATENT-CLASS-60-303 ..... N84-17555*
US-PATENT-CLASS-60-311 ..... N84-17555*
US-PATENT-CLASS-210-748 ..... N84-17555*
US-PATENT-CLASS-422-121 ..... N84-17555*
US-PATENT-CLASS-422-169 ..... N84-17555*
US-PATENT-CLASS-422-178 ..... N84-17555*
US-PATENT-CLASS-422-186 ..... N84-17555*

US-PATENT-4,376,637 ..... N84-17555*

USAARL-83-14 ..... N84-17860 #

USAAVRADCOM-TR-83-D-23 ..... N84-17176 #
USAAVRADCOM-TR-83-E-2 ..... N84-17181 #

USAFA-TR-83-15 ..... N84-17145 #

USAIRO-TR-83/3 ..... N84-17122 #

USARIEM-M-4/84 ..... N84-17831 #
USARIEM-M-5/84 ..... N84-17826 #
USARIEM-M-9/83 ..... N84-17824 #

USARO-TR-D-65 ..... N84-17961 #

USCG-BULL-67 ..... N84-17793 #

USCG-188-36 ..... N84-17793 #

USGS-GD-83-009 ..... N84-17749 #

USNA-TSPR-122 ..... N84-18133 #

UT-GC-575 ..... N84-17790 #

UTRC-R83-956114-12 ..... N84-17333 #

UTRC-884-915908-29 ..... N84-17407* #

UTRC/R83-912666-58-VOL-1 ..... N84-17149* #

UWME-DR-301-103-1 ..... N84-17294 #

VKI-NT-148 ..... N84-17553 #

WBWT-TR-1187 ..... N84-18088* #

WDL-TR9954 ..... N84-17960 #

WES-8 ..... N84-17792 #

WHOI-83-24 ..... N84-17800 #
WHOI-83-30 ..... N84-17796 #

WMO-8 ..... N84-17764 #

WRRI-113 ..... N84-17767 #

W83-04158 ..... N84-17767 #
W84-00007 ..... N84-17684 #

019795-1-T ..... N84-17489 #

☆ U.S. GOVERNMENT PRINTING OFFICE: 1984—421-562/408

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*'. from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business

Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

UNIV
HARLA
DOC
A

POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Return